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Gulf Coast Number

The OIL AND GAS JOURNAL

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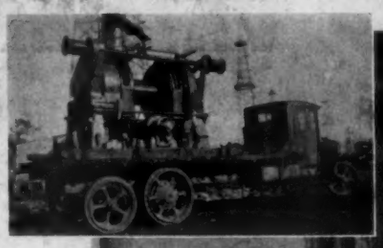

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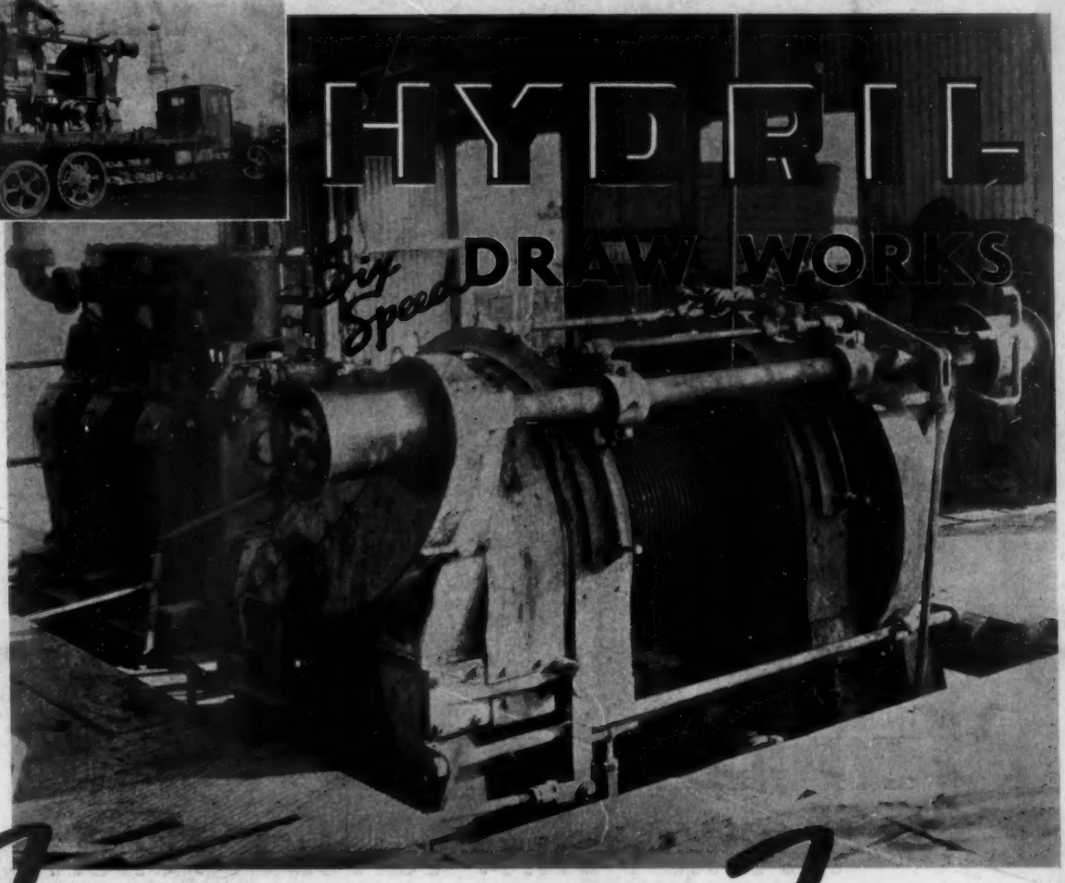

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April 4, 1935

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SPECIAL ARTICLES

Summary of Situation ---- 35
By ANDREW M. ROWLEY
The Bulletin Board ---- 36
Rescue Impossible Without Help (Cartoon) ---- 37
Geological Survey of Gulf Coast ---- 38-39
By E. G. WOODRUFF
New NRA Bill and Oil Code ---- 40
By HUGH D. MALLON
Oil Industry and Rayburn Bill ---- 41
By C. O. WILLSON
Couzens Writes Allred on Gas Line ---- 41
Pennsylvania Refiners Use Solvents ---- 42
By R. C. CONINE
Oil and Gas Laws in Kansas ---- 42
More Drilling Needed as Reserves Fail 43
By ANDREW M. ROWLEY
Oil Legislation at Washington ---- 44
By HUGH D. MALLON
Byles and Lederer on Labor Bill ---- 44
Setting Screen in High Pressure Wells 46
Bottom Hole Chokes on Gulf Coast ---- 48
Burning Down the House (Editorial) ---- 50
News From Foreign Lands ---- 52
Multistage Separator Installation ---- 63
Gulf Coast Development Program ---- 65
By NEIL WILLIAMS
Southwest Texas Possibilities ---- 68
By F. L. SINGLETON
Exploring Submerged Regions ---- 69
Electric Power in Oil Fields ---- 72
By F. M. AUSTIN and P. H. ROBINSON
Reducing Corrosion Losses ---- 84
By WALTER F. ROGERS
Pumping on Gulf Coast ---- 87
Selection of Muds ---- 89
By C. B. KENNEDYE
Special Reworking Technique ---- 96
By M. L. CASHION and M. R. REDDICK
Personnel of Gulf Coast and Southwest Texas Companies ---- 97-143
Map of Southeast Texas ---- 108-109
Map of Southwest Texas ---- 120-121
Map of Coastal Louisiana ---- 126-127
Reflection Shooting ---- 129
By ROBERT P. CLARK
Control of Pressure ---- 132
Double Drawworks ---- 136
Electrical Prospecting ---- 137
By E. W. K. ANDRAU
Combatting Heaving Shale ---- 138
Wire Line Core Drilling ---- 140
By L. T. ANDERSON
Houston Oil Show Ready ---- 141
Mud Pump Using V-belt ---- 144
Unique Type of Rotary ---- 146
Administrator's Report on Stocks ---- 172
Field Problems From Readers ---- 189
Edited by T. F. SMILEY
Osage Lease Sale ---- 190

FIELD OPERATIONS

Southwest Texas ---- 152
West and North Texas ---- 153
East Texas ---- 154
Gulf Coast ---- 161-162
Central West ---- 163
N. Louisiana-Arkansas, Mississippi ---- 164
Michigan ---- 165
Kansas ---- 166
California ---- 167
Oklahoma ---- 169
Eastern Fields ---- 171
Rocky Mountain Area ---- 174
Canada ---- 174

REFINING AND MARKETING

Group 3 Market ---- 54
By T. F. SMILEY
New York Market ---- 55
A.P.I. Refinery Report ---- 55
Refinery and Crude Oil Prices ---- 56-57
Tank Wagon Markets ---- 58
Natural Gasoline Manufacture ---- 60
News for Petroleum Refiners ---- 61
Chicago Market ---- 151
Technical Questions Answered ---- 179
By C. K. FRANCIS, Ph.D.

GENERAL DEPARTMENTS

Natural Gas Developments ---- 180
Do You Remember? ---- 182
Personal Paragraphs ---- 182-183
Record of Oil Securities ---- 188
Classified Advertising ---- 191
Index to Advertisers ---- 192

OIL MAN'S CALENDAR

April

4—Los Angeles, Calif., California Natural Gasoline Association.

4-5—Excelsior Springs, Mo., Western Petroleum Refiners Association, annual meeting.

8-13 — Houston, Tex., Oil Equipment and Engineering Exposition.

10-11 — Amarillo, Tex., American Petroleum Institute Mid-Continent Production Division, spring meeting, Herring Hotel.

10-11—Indianapolis, Ind., Indiana Independent Petroleum Association, spring convention, Hotel Severin.

11-13—Dallas, Tex., Petroleum Industry Electrical Association, Baker Hotel.

18-19 — Cleveland, Ohio, National Petroleum Association, semiannual meeting, Hotel Cleveland.

25-26 — San Antonio, Tex., American Petroleum Institute Southwestern Production Division, Plaza Hotel, spring meeting.

May

1-3—Tulsa, Natural Gasoline Association of America, Hotel Tulsa.

6-9—Memphis, Tenn., Natural Gas Department, A.G.A., Peabody Hotel.

8-11—Tulsa, Oil and Gas Power Division of A.S.M.E., Mayo Hotel.

14-16—Tulsa, American Petroleum Institute, fifth mid-year meeting, Mayo Hotel.

June

20-21 — State College, Pa., Pennsylvania Grade Crude Oil Association, annual meeting.

September

25-27 — Atlantic City, N. J., National Petroleum Association, annual meeting, Hotel Traymore.

November

4-5 — Dallas, Tex., I.P.A.A., annual convention.

11-14 — Los Angeles, Calif., American Petroleum Institute, sixteenth annual meeting, Biltmore Hotel.

Refinery Section Starts on Page 54

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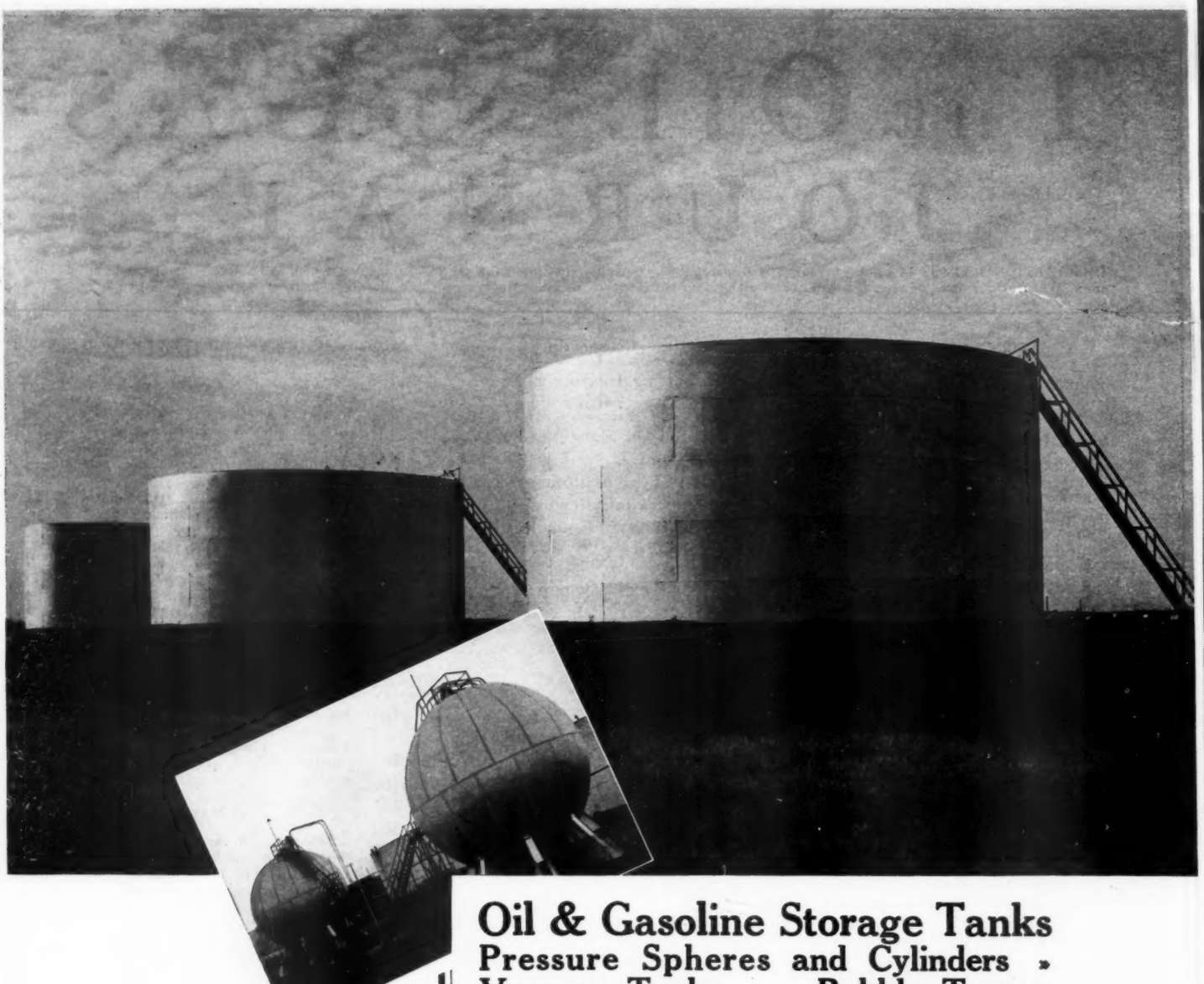

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Large Development Programs of Oil Companies Await Clearing of Governmental Uncertainty

By ANDREW M. ROWLEY

TAX legislation and other measures affecting the petroleum industry being considered by legislatures of the various states, coupled with the uncertainty prevalent as to what might be done in Washington, are the greatest handicaps to business recovery being experienced by the oil business. Development programs of vast magnitude, representing expenditures of large sums of money for materials, equipment and labor, have been prepared by many companies and the inauguration of these plans would mean a big forward step towards better times for the many industries dependent to a great extent upon sales to the petroleum industry, in addition to farmers, land owners and workers in all branches of the business.

But with government giving every evidence daily that it is not interested in business recovery nearly so much as it is in raising still greater sums of money from new taxes and new levies, many development programs are being held in abeyance as business men are reluctant to execute plans involving large expenditures in the face of present uncertainties. It is the old case of killing the goose that lays the golden egg. Plans outlined by oil companies would benefit directly thousands of persons, not only connected with the oil business, but interested in other industries, and government would benefit by a greater return from present tax laws.

New crude oil reserves are not being discovered in sufficient quantity to anywhere near balance present consumption, despite a substantial increase in drilling activity. Oil companies realize this fact and are prepared to start one of the greatest drilling campaigns ever witnessed but some officials think this business boom will have to await the adjournment of Congress and the state legislatures.

Field activities continue on a large scale in areas where recent discoveries have stimulated further drilling, notably in Kansas, and developments of the past week were such as to indicate greater activity in other sections. Michigan came to the front with the largest initial production from a wildcat in its 10 years of oil history when the test of the J. W. Leonard Drilling Company in Montcalm County, central Michigan, flowed wildly for 18 hours and is estimated good for 5,000 barrels daily. Drilling operations in California are far greater than at this time last year and in Oklahoma there are 106 wildcatting operations out of a total of 548 drilling projects.

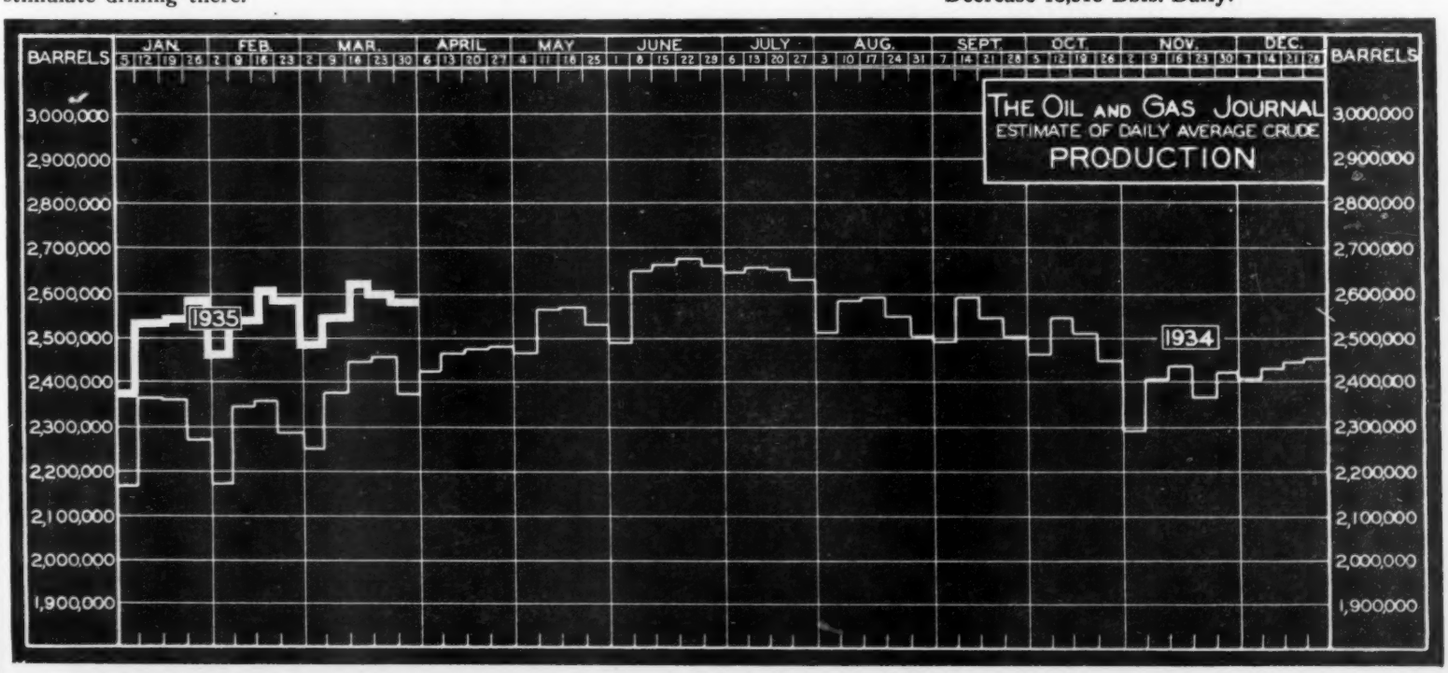
Illinois broke into the news column with a 70-barrel a day well from 672 feet while a wildcat in Rice County, Kansas, gave promise of opening a new pool. A promising showing in a test in the Port Lavaca area of Calhoun County on the Gulf Coast is expected to stimulate drilling there.

Crude Oil Production in the United States

Estimated daily average production for the week ending March 30, a comparison with previous week and the Federal allowables follow:

		Federal allowable	
Oklahoma—	March 30	March	March 23
Oklahoma City	146,875	.....	162,975
Seminole-St. Louis	95,525	.....	100,775
Remainder of State	250,250	.....	250,795
Total Oklahoma	492,650	491,000	514,545
East Texas—			
Lathrop	165,327	.....	160,310
Kilgore	155,410	.....	150,270
Joiner	152,760	.....	145,219
Total East Texas	473,497	.....	455,799
West Texas	146,614	.....	145,975
North Central Texas	90,273	.....	90,260
Texas Panhandle	73,065	.....	65,055
East Central Texas	51,475	.....	52,427
Gulf Coast—Texas	182,287	.....	181,890
Southwest Texas	60,270	.....	60,264
Total State of Texas	1,077,481	1,020,100	1,051,670
Kansas	154,900	139,700	153,050
North Louisiana	22,925	.....	23,060
Gulf Coast—Louisiana	96,597	.....	95,243
Total Louisiana	119,522	110,500	118,303
Arkansas	30,595	31,900	30,815
Eastern Fields (except Michigan)	106,750	105,500	105,250
Michigan	37,712	31,600	36,912
Rocky Mountain area	95,740	97,400	95,320
California—			
Santa Fe Springs	37,950	.....	39,100
Long Beach	60,500	.....	65,250
Mountain View	10,750	.....	12,000
Elwood	10,250	.....	10,500
Kettleman Hills	64,000	.....	65,250
Remainder of State	290,550	.....	309,900
Total California	474,000	492,600	502,000
Total United States	2,589,350	2,520,300	2,607,865

Decrease 18,515 Bbls. Daily.



The Bulletin Board

Disastrous Results are predicted if the Wheeler-Rayburn Public Utility Bill is enacted according to those who have made an exhaustive study of the measure which among many other provisions stipulates that an operating natural gas company would have to get authorization from one of the government's commissions before it could undertake any construction or extension of any facilities or to tap any new source of supply.

•

East Texas Companies which are alleged to have evaded rules and regulations of the Texas Railroad Commission were placed in receivership on March 30 on petition of the State of Texas.

•

A New NRA Bill has been introduced into the Senate and there is a feeling in Washington the petroleum industry will continue under the general terms of the new measure.

•

Solvent Extraction is to become one of the principal tools in refining Pennsylvania Grade oils according to an address delivered a large number of refiners in Oil City, Pa.

•

Few Oil Discoveries in comparison to the number of wildcats drilled, many of which were located after careful geophysical surveys, emphasize the need of increased drilling to provide necessary crude oil reserves.

•

Electrical Well Surveying, or Schlumberger methods, are of especial value to the geologist in correlating his well logs and in correlating electric logs faults may be traced from well to well.

•

Double Drawworks are being installed on many operations where the drilling is deep and high pressures are encountered so that danger of shutdowns with attendant possibilities of sticking the pipe may be minimized.

•

Electric Power is being used in increasing volume for drilling and pumping wells with greater efficiencies being obtained due to improvements in motors and hook-up arrangements.

•

Conditioning Drilling Mud presents many problems which engineers and companies are studying due to deep drilling and the possibility still greater depths will be reached in the search for crude.

Governor Allred of Texas is preparing to ask the legislature for enactment of a measure which would provide for state owned pipe lines and gasoline plants to handle natural gas from the Texas Panhandle.

•

Labor Difficulties would be enhanced and neither employe nor employer would benefit under provisions of the Wagner labor relations bill being considered by a Senate committee, according to Axtell J. Byles, speaking for the American Petroleum Institute, and Dr. E. R. Lederer for the labor subcommittee of the Planning and Coordination Committee. It is claimed the bill is framed primarily to confer rights and power not upon American labor but upon the National Board and upon labor organizers.

•

Maritime Drilling operations on the Gulf Coast present numerous special problems which the oil companies have solved during the extensive development of this type of property.

•

High Pressure Drilling, with the constant danger of serious blowouts, has resulted in the development of surface control equipment and drilling practices which, with precautions being taken at all times, have eliminated to a great extent the blowout problem.

•

Corrosion Losses in producing oil, especially severe where sulphide gas is produced with the fluid, have been reduced by research and study, the results of which permit a selection of equipment which will reduce the production cost.

•

Reworking Old Wells will gain in importance when economic conditions improve and one of the most important developments in this practice is the use of oil, oil base muds and special highly colloidal muds in screen pulling and perforating jobs.

•

Geophysical Methods used in exploration work in searching for new oil fields have improved greatly with more highly trained crews and better instruments, and at the present time out of about 168 crews working in the United States 72 are making surveys in the Louisiana and Texas coastal areas and in Southwest Texas.

•

New Fields may be discovered between the salt dome fields and a careful geophysical study of the intermediate areas offers many possibilities of finding new pools not directly associated with salt domes according to a geologic study of the Gulf Coast.

Rescue Impossible Without Help

—Drawn Exclusively for The Oil and Gas Journal.

Oil Fields of Gulf Coast Area Found in Sediments of Late Geological Age

By E. G. WOODRUFF
Consulting Geologist, Tulsa

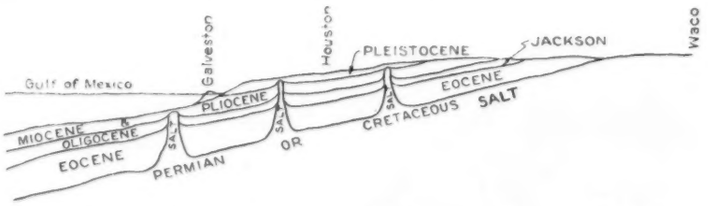
This paper summarizes the oil situation in the Gulf Coast of Texas and Louisiana from a geological standpoint, but also deals with some of the production problems. The information presented was obtained by a study of the region by the writer and by a study of the publications of the many men who have worked in that region, and acknowledgement is made to E. DeGolyer, Wallace E. Pratt, M. A. Hanna, A. Deussen and others.

In a historical way it is difficult to say just when the search for oil began in the coast country. After the oil wells were opened in Pennsylvania in 1859 every city and town in the country saw visions of oil fields near it. Texas and Louisiana people also had such visions, but some of the leading citizens of Beaumont, Tex., converted their dreams into action in 1892 when they organized an oil company. This company made several attempts to find oil at Spindletop, a low mound, a few miles south of that place.

Early in 1899 Capt. A. F. Lucas came to Beaumont from Louisiana where he had directed the drilling for salt and sulphur. That drilling had found shows of oil and gas and had greatly interested him in the oil business. At Beaumont, Captain Lucas took over the leases on Spindletop from the old company and financed the start of another well, that was drilled to 575 feet when the money gave out. Captain Lucas went to Pittsburgh and persuaded Guffey and Galey to finance another well which came in January 10, 1901, at 1,160 feet. The drillers were not prepared to handle the gas and oil which blew the pipe from the hole, wrecked the derrick, and spouted 200 feet into the air. It was estimated that 750,000 bbls. of oil flowed from the hole.

Such was the beginning, a 1,000-foot well running wild; now 35 years later wells are drilled to 10,000 feet and wells come in for as much as 35,000 bbls. without losing a barrel of oil. The work has expanded from 1 oil dome to more than 90 producers of oil and more than 125 which have been located, and have been nonproductive of oil or have not yet been tested. The accompanying map shows the location of these domes.

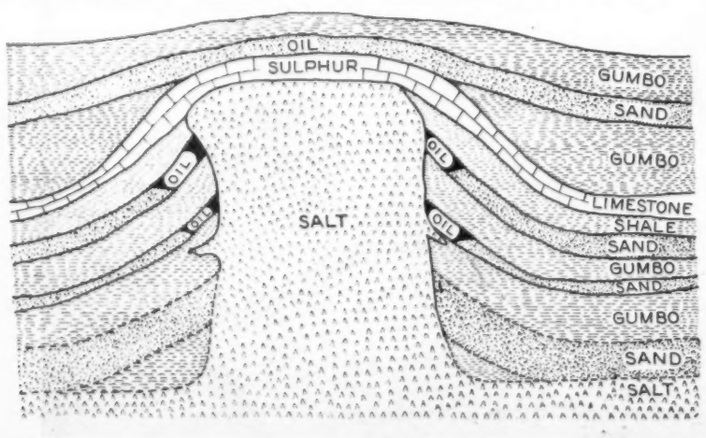
In the early days a "dome" was a surface mound under which there might be salt or sulphur. There were not many of these low hills, but the term became so common with the oil men that now it is generally used to mean any circular uplift, whether a hill, or subsurface movement of the formations which does not show on the surface but can be found only with instruments. The idea of a dome was vague in the early days but since that time a study of drill cuttings and small fossils in the formations has given us a fairly accurate idea of the salt dome structure. As shown by Figure 1 the dome is a great mass or plug of salt shoved upward into the formations from great salt bed-like reservoirs more than 10,000 feet below the surface of the ground. There is plenty of evidence to show that it has been shoved up from below and it must come from more than 10,000 feet because the drill has gone that deep without finding the main salt mass. Mr. DeGolyer, who has made a careful study of the region, says the main salt mass is more than 10,000 feet but probably less than 30,000 feet deep.



Generalized section of region between Waco and Galveston, Tex., showing sequence of formations outcropping

To make so many domes over so wide an area as is shown by the map there must be a thick strata of salt under all of the Louisiana coast country and southeastern Texas. Probably there are various areas of Southwest Texas likewise underlain. There are also salt domes in the Tyler Basin, to the east of the Sabine uplift and as far north as Smackover, Ark. These plugs are of various sizes and shapes, they are as small as a few hundred feet across the top or as large as 2 or 3 miles. Some of these columns of salt are 2 and possibly as much as 3 or 4 miles high.

Some salt plugs come to within a few hundred feet of the ground. Some of the tops of the salt are so near the surface that shafts have been dug into them and extensive salt mines operated, whereas others are "deep seated," meaning that the drill has not reached the top of the salt. These salt masses are generally domed over the top and are very irregular on the sides, branches, wedges and chutes extending out into the formations, especially along the bedding planes of adjacent formations. In some places the salt overhangs at the top. The drill may go into solid salt and pass through it and out again into shale or oil sand. In such place it seems that the oil is under the salt.

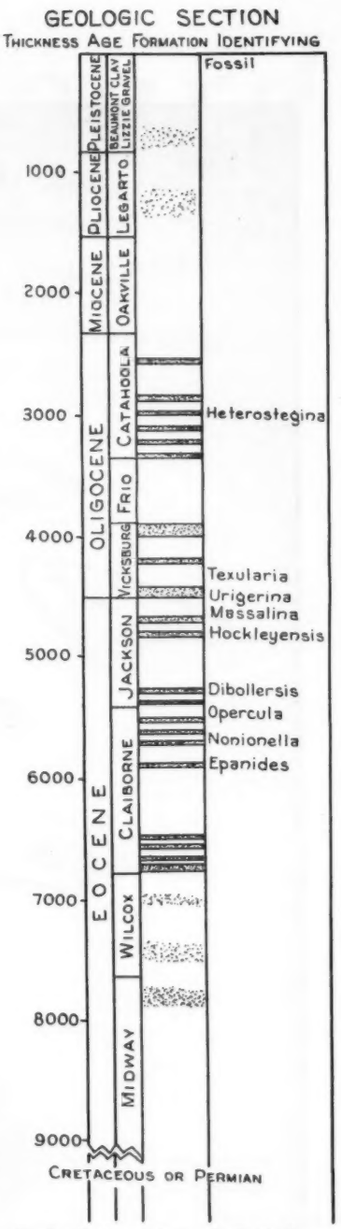


Ideal section of typical salt dome of Gulf of Mexico coast, Texas and Louisiana

One way to grasp the idea of the salt columns is to think of the coast country with all sand, shale and gumbo beds removed from around the salt domes and down to the main salt strata. In that case there would appear scattered over the country at places shown on the map and at some others not yet discovered as many as 300 and possibly 500 salt plugs or columns. These salt columns or pillars would be irregular in size and shape; some would be as slender as 300 or 400 feet in diameter and more than 2 miles high, while it might be a mile through others. The tops would be uneven, some being higher than others. The deep seated ones would be low. The sides would be rough with overhangs on the sides or tops and stringers extending out. Perhaps such a picture is fanciful, but it accords with the facts of the salt plugs.

Where the salt came from and how it reached its present location is left for more technical articles to discuss but the salt must be strata which was deposited in basins, hence the domes can be expected only where there were low basins such as the Gulf Coast, the Tyler Basin and Smackover, and not on the central high or the Sabine uplift. Salt domes occur only in oil provinces where all conditions are just right.

However, the upward movement of the salt created conditions favorable for the accumulation of the oil. The strata are arched over the top of the salt dome and forms a trap for the oil; the formations on the side of the domes are uplifted against the plug and are sealed by the salt so the oil accumulates but cannot escape, and thus the top pools and the side pools are formed. The forces were irregular so the strata were faulted. There are many small faults, others have a displacement as much as 200 to 300 feet. There was squeezing and pressing and slipping which caused some of the shales to flake and slickenside so that when the pressure is removed by drilling the hole the shale heaves. In addition there are many other peculiar features of salt domes which space will not permit discussing now.



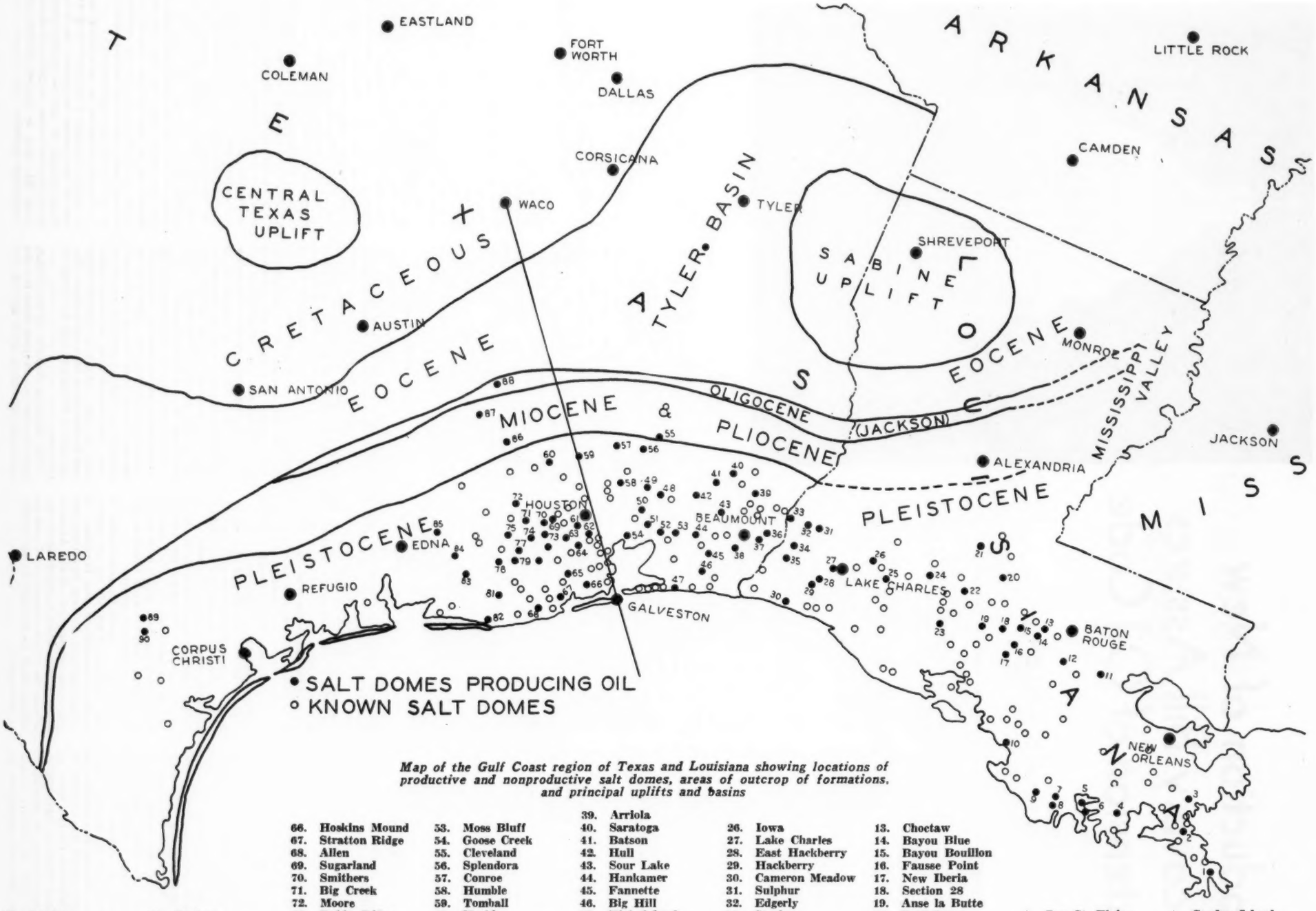
Geological section of Gulf Coast region

Domes Scattered

The location of the domes is shown on the accompanying map and a number placed beside each location. This number corresponds to the number in the list giving the name of the dome. It is to be noted that the domes are the thickest in the Houston area, but they are numerous about Beaumont, Tex., and between Lake Charles and Baton Rouge, La. Domes are scarce between Edna and the Rio Grande River. Domes are under water and it is most probable that there are many domes along the shore under the waters of the Gulf and as need for more oil develops means of locating them will be applied, as well as methods of drilling under the water adapted to this off shore area. There are probably tremendous reservoirs of oil under the Gulf.

Since the domes have their source in the salt beds they can occur only where there is a wide spread thick salt strata deep below the surface and where the

(Continued on Page 149)



Map of the Gulf Coast region of Texas and Louisiana showing locations of productive and nonproductive salt domes, areas of outcrop of formations, and principal uplifts and basins

85. Louise
86. Raccoon Bend
87. Brenham
88. Clay Creek
89. Palangana
90. Piedras Pintas

79. Pledger
80. Nash
81. Shepard's Mott
82. Big Hill
83. Buckeye
84. Markham

66. Hoskins Mound
67. Stratton Ridge
68. Allen
69. Sugarland
70. Smithers
71. Big Creek
72. Moore
73. Rabbs Ridge
74. Long Point
75. Boling
76. West Columbia
77. Damon Mound
78. Van Vleck

53. Moss Bluff
54. Goose Creek
55. Cleveland
56. Splendora
57. Conroe
58. Humble
59. Tomball
60. Hockley
61. Pierce Junction
62. Mykawa
63. Blue Ridge
64. Manvel
65. Danbury

39. Arriola
40. Saratoga
41. Batson
42. Hull
43. Sour Lake
44. Hankamer
45. Fannette
46. Big Hill
47. High Island
48. South Liberty
49. North Dayton
50. Esperson
51. Barbers Hill
52. Lost Lake

26. Iowa
27. Lake Charles
28. East Hackberry
29. Hackberry
30. Cameron Meadow
31. Sulphur
32. Edgerly
33. Starks
34. Vinton
35. Black Bayou
36. Orange
37. Port Neches
38. Spindletop

13. Choctaw
14. Bayou Blue
15. Bayou Bouillon
16. Fausse Point
17. New Iberia
18. Section 28
19. Anse la Butte
20. Port Barre
21. Pine Prairie
22. Bosco
23. Gueydan
24. Jennings
25. Welsh

7. Bay St. Elaine
8. Lake Pelto
9. Dog Lake
10. Belle Isle
11. Sorrento
12. White Castle

1. Garden Island
2. Lake Washington
3. Pointe la Nache
4. Leesville
5. Timber Bayou
6. Terrebonne

Introduction of New Recovery Bill Assures Extension of Oil Code

By HUGH D. MALLON
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., Apr. 1.—Introduction of a new National Industrial Recovery Act in the Senate by Senator Pat Harrison, of Mississippi, removed any doubt that the petroleum industry will be governed by a code for at least two years longer, unless supplementary legislation is passed specifically eliminating the industry from the provisions of the N.R.A. The present outlook is the industry will continue under the general terms of the Recovery Act, as it is doubtful any control law will be passed at this session.

The new N.R.A. bill provides that no trade or industry shall be eligible for a code unless the character or volume of employment can be construed as in interstate commerce.

Labor Clause

The President is authorized to set up a limited code of fair competition wherever he finds that excessive hour or inadequate wages of employes are productive of unfair competition. This type of code shall contain only requirements for minimum wages, maximum hours, Section 7(A) of the bill, which is practically identical with that section of the original act, prohibition of child labor, and any unfair business practice which is generally recognized as being dishonest, fraudulent or unfair. Such conditions as the President finds necessary to prevent unfair or oppressive conditions of employment, or the waste of any natural resource may also be included in these limited codes.

Provision will also be made fixing maximum hours and minimum wages, while the President is given the authority to provide such exceptions to, exemptions from, and amendments of, any code, as upon a finding of fact, he deems necessary.

Antitrust Section

As a means of preventing monopolistic practices it is provided that nothing in this bill shall be construed to suspend the provisions of the antitrust laws, except that practices followed pursuant to the provisions of any accepted and approved code shall not be subject to the antitrust laws, and any violation of the terms of such code shall be deemed an unfair method of competition within the meaning of the Federal Trade Commission Act, as amended. However, nothing in the act shall be construed as impairing the exercise of the powers of the Federal Trade Commission, except as is consistent with the terms of the bill. The general opinion is that this is a clarifying statement which will eliminate any such action as was taken by the Department of Justice in calling a halt on the original Pacific Coast Cartel Agreement.

The President is authorized to enter into agreements with, or approve voluntary agreements entered into between and among, persons engaged in a trade or industry or subdivision thereof, labor organizations, and trade or industrial organizations, associations, or groups, relating to any trade or industry or subdivision, if he finds such agreements are reasonably designed to aid in effectuating the policy of Congress. Any agreement so entered into, or approved, shall be enforceable in accordance with its terms by civil suit in any state or federal court of competent jurisdiction.

Oil Sections

Section 9(a) and 9(b) of the original act are included in the new bill in slightly changed form. These sections relate specifically to oil. They now read as follows:

"Section 9(a). The President is further authorized to initiate before the Interstate Commerce Commission proceedings necessary to prescribe regulations to control the operations of oil pipe lines and to fix reasonable, compensatory rates for the transportation of petroleum and its products by pipe lines, and the Interstate Commerce Commission shall grant preference to the hearings and determination of such cases."

"(b). The President is authorized to institute proceedings to divorce from any holding company any pipe line company controlled by such holding company which pipe line company by unfair practices or by exorbitant rates in the transportation of petroleum or its products tends to create monopoly."

Enforcement Provisions

The President is given broad discretionary powers over imports and tariffs. This section could be construed to give the President power to declare an embargo over any commodity or to allow free importation. It is doubtful that this section will be enacted in anything like its present form.

The enforcement provisions are drastically changed in the proposed law, all reference to prison sentences being eliminated. The penalty for violations is assessment of fines if a criminal action is brought, but the terms of the law encourage injunctive proceedings rather than criminal. It has been contended by several lawyers that the way to enforce codes is by injunctions rather than jail or fines. If an injunction is granted, the person enjoined will be in contempt of court if he violates the injunction, whereas a prison sentence, or fine, is merely a pecuniary or punitive penalty which does not restrain persistent violators from continuing their illegal practices.

It is declared the duty of district attorneys, under the direction of the Attorney General, to institute proceedings to prevent and restrain violations of any code or agreement to which the President is a party under this law. The amount of fine to which an individual may be subject has not been determined, but it is declared each day such violation continues is a separate offense.

Provision is made for compromise of any violation of the law by the agency to be designated by the President. A compromise may, however, be entered into only with the approval of the Attorney General, after which a consent decree enjoining the future commission of such an offense shall be entered in the records of the court.

—Photo by John C. Day.

The act provides that, after due notice and hearing, upon complaint by an employe alleging any violation of a code relating to minimum wages and maximum hours, a governmental agency determines that any person has violated such provision and has ascertained the damage resulting, if any, an order shall be issued directing the violator to pay such damages to such employe. If the violator does not comply, the complainant may within six months file suit in state or federal court. A minimum amount of damages will be set by the act.

The provisions of the Federal Trade Commission Act, including penalties, shall be available to any agency of the United States under this act.

It is provided that existing codes shall be extended 90 days to allow for revisions and amendments to comply with the new law.

Production Control

Provision is made that devices for controlling prices, production or distribution may be applied where found necessary and proper by the President to protect small enterprises against discrimination or oppression or to deter the growth of monopolies, or where necessary to provide correctives for emergencies caused by large volumes of production in excess of effective demand or by destructive price cutting, or to those trades or industries which are now, or hereafter subjected to government regulation of prices, services and methods of operations as public utilities, or as natural resource industries (such as, among others, coal, oil or gas) or because they are found to be affected with a public interest.

These provisions, it is claimed, are directed mainly at the natural resource industries, particularly oil, which it is believed, if there is to be any control over production, must be provided for in the law. The reference to industries which may be made subject to federal regulation is inserted on the outside chance that oil control legislation may be passed by Congress.

The licensing features of the N.R.A. now in effect are dropped from the recommended legislation, while the only reference to price fixing is in relation to the natural resource industries. It is expected inclusion of these provisions affecting the natural resource industries will be vigorously opposed by some members of Congress, and their inclusion in the final draft is doubtful.

Federal Circuit Court Panhandle Gas Hearing

NEW ORLEANS, La., Apr. 1.—Denial by the Federal Court of the Northern District of Texas of an application of owners of three oil and gas land properties in the Panhandle for an injunction to restrain other operators from taking gas from the Panhandle reservoir for the purpose of stripping it for gasoline, was reversed and remanded by the U. S. Court of Appeals for the Fifth Circuit.

The plaintiffs, J. T. Sneed, Jr., E. C. Britain and Henry Schafer, Inc., charged that the defendants, Phillips Petroleum Co., Shamrock Oil & Gas Co., and Lawrence R. Haay and others, were draining a common pool for "wasteful purposes."

In reversing the lower court the Circuit Court held the questions at issue should be decided only after hearing every party interested.

In a dissenting opinion Judge Joseph C. Hutcheson, Jr., of Houston, said:

"I cannot agree with my associates that absence of indispensable parties requires the reversal of this decree . . . the charge that the use of the defendants are making of gas is wasteful and may be enjoined, I think, is contrary to the settled law of Texas regarding the taking of oil and gas. The law is, an owner of oil and gas lands may take oil and gas from them, at least for any beneficial use, and the use here is certainly a beneficial one, in any quantity without being subject to judicial restraint at the suit of other landowners.

"I think it cannot be maintained that a court of equity will interfere at the suit of one owner, to prevent the beneficial, though it may be uneconomical, use by another owner, of gas or oil drawn from this land by proper drilling and production methods."

Oil Industry Is Vitally Interested in Holding Company Legislation

By C. O. WILLSON

NEW YORK, Apr. 1.—Detailed studies of the Rayburn "public utility bill" which are now being made in this section by representatives of investors, holding companies and operating units are serving to emphasize the disastrous results which are certain to follow the passage of the bill or any substitute measure incorporating substantially the same provisions. The bill itself, on which hearings are being held at Washington before the House Committee on Interstate and Foreign Commerce, consists of 178 pages of intricate provisions and even those who are directly concerned have been slow in appreciating the full significance of this proposed national legislation which has no parallel among existing laws as to scope and drastic regulations. As explained by one group of investigators several hundred pages would be required to make an adequate detailed analysis of the provisions and application of the bill.

It has been assumed by many that due to the mounting opposition and the pressure of other legislation now pending, there is no danger of the bill's passing during the present session of Congress. There is no justification for this assumption according to those in a position to know. While there does not appear to be any pressing support for the immediate passage of such a bill by Congressmen and Senators, it does have the active support of certain government officials who were responsible for its introduction and due to that fact there is danger of its being forced through the present session as an administration measure.

Those opposing the bill are hopeful that passage as emergency legislation can be prevented through the expressed opposition of those directly concerned including several million investors who will "hold the sack" in this latest proposed extension by government into business.

It is believed that if immediate passage can be prevented not only the general public but the sponsors of the bill itself will realize the unfair and often conflicting provisions of the bill which if allowed to become part of a federal law will ultimately prove as disastrous to the customers of the public utilities concerned as to the owners and operators themselves. These public utility companies have repeatedly explained that they have no objection to federal legislation which would prevent abuses in holding company operations and have suggested ways that this can be done without wrecking the present corporate and operating structures and without losing benefits in the future which have accrued to this type of management and ownership in the past.

General Significance

In this connection the realization is spreading that the Rayburn bill has significance outside the immediate provisions which apply only to the electric power and light and natural gas industries. Holding company operations are not confined to these utilities. In fact either directly or in effect the holding company principle has been applied in the development of the major industrial and utility operations of this and other countries. Without this facility it would have been impossible to obtain the financial support and efficient management which are especially necessary in large scale operations. If there is something basically wrong with holding company operations which seems to be the motivating thought back of the Rayburn bill —then it is reasonable to assume other utilities and many industries, in turn are to be taken to Washington and run through the wringer and made to conform to any arbitrary standards the government sees fit to establish. Obviously the present administration cannot eliminate supposed evils in the electric power and natural gas industries and then in effect condone the same offenses in other businesses by the simple expediency of ignoring them.

It is contended that this general angle to the Rayburn bill is of special importance to the oil industry. The bill, itself, is of direct concern to the oil business as will be explained later due to the proposed control of the closely allied natural gas industry and the ending of the inter-related ownership and management of important oil and gas units whose operations will have to be segregated should the bill become a law. This situation in itself justifies the united opposition of the entire oil industry to the bill. However, of even greater importance it is felt, is the fact that such a law might be the forerunner of similar legislation applying to the entire oil industry. The public utility character of the oil business has been emphasized in numerous official statements emanating from Washington over the past two years and it has been the basis for the proposed control legislation. The distribution of gasoline is more widespread than electric power and light, and many other products of petroleum have a more universal sale than does natural gas. The time may come, with or without a demand from these customers of the oil industry, when it will be considered expedient to enact far-reaching federal control legislation. If the Rayburn provisions are to be the pattern for this legislation, the concern expressed recently by many in the oil and other industries serving the public, can be readily understood.

Provisions of Bill

Some of the provisions of the Rayburn bill have been explained in previous issues of this publication. It would be impossible here to discuss the numerous features of the bill which was introduced in the lower house in early February. From the studies that are being made it is possible to summarize some of the more important provisions with particular reference to their significance in the oil and natural gas industries.

In successive steps the bill provides for elimination of holding companies which is to be coupled with the reorganization of the operating companies. Not later than October 1, 1935, every holding company using the mails and the facilities of interstate commerce in the transmission and sale of electrical energy and natural gas in interstate and foreign commerce and for other purposes, must register with the Securities Exchange Commission. This registration includes an agreement to comply with the provisions of the act. By January 1, 1936, the holding companies must cease to perform services to the operating units.

By January 1, 1937, the following requirements become effective:

A holding company either must dissolve or it must eliminate any interest on its part or on the part of its subsidiaries in any other business than the electric and gas business. Excepted from this requirement is any business expressly authorized by a state commission and any business which Securities Exchange Commission may consider incidental. These exemptions might permit the retention of such interests as real estate holding companies or companies manufacturing and selling gas by-products. Interests in other than incidental lines of business will have to be eliminated.

Any holding company or subsidiary which is an electric utility company must dispose of, probably for cash, the securities of any company which owns or operates interstate natural gas pipe lines or producing natural gas properties whether or not such producing properties are a part of an interstate natural gas system, and also any such property directly owned.

A holding company or any subsidiary which has both foreign and domestic interests must either dissolve or eliminate one of these interests.

A holding company or any subsidiary which has an electric utility company and a gas utility company serving substantially the same territory must either dissolve or dispose of its interest in one of these subsidiaries, if a single utility company under applicable laws of the state would not be permitted to render both classes of utility service.

Securities Exchange Commission has discretionary power to extend this date, but not beyond January 1, 1939.

The next important date is January 1, 1938. By that time every holding company must dissolve or eliminate any interest on its own part or on that of its operating subsidiary in any operation not deemed by Securities Exchange Commission necessary or appropriate to a geographically and economically integrated public utility system.

Any holding company or any operating subsidiary must be dissolved or reorganized if it appears to Securities Exchange Commission that its corporate structure or continued existence unnecessarily complicates the structure of the public utility system of which it is a part. The Securities Exchange Commission may extend this date to January 1, 1940.

By January 1, 1940, every holding company must be dissolved unless the Federal Power Commission issues a certificate that its continuance is necessary for the operation of a geographically and economically integrated public utility system or the holding company nor any subsidiary company thereof is a public utility or doing business within the United States.

Control Operating Units

The foregoing shows the steps by which holding companies are to be ended. It has been this feature of the bill which has received the greatest publicity. Its significance from the standpoint of the investor, and management including many thousands of employes is apparent. But this is probably second in importance to the provisions applying to the control of the operating units. Many have sensed this situation and have said that the "holding company" feature was partially a "smoke screen" to obtain public support for a bill whose real intent was to destroy private operation of the two public utilities and ultimately bring about Government ownership.

Be this as it may, it cannot be denied that the bill provides for control and regulation on a scale never before suggested for public utilities. There will be practically nothing that these companies can do without first securing the permission of the Federal Power Commission, the Federal Trade Commission or the Securities and Exchange Commission. Incidentally it is felt that there is something incongruous in an act which seeks to "free" operating utilities from the alleged unnecessary and parasitic control of holding corporations and then turns around and fastens on them a bureaucratic control that will circumscribe every phase of their operations.

In this connection it is pointed out that an operating natural gas company or electric power and light company would have to have authorization from one of the Government's commissions to do any of the following:

Undertake any construction or extention of any facilities.

Acquire or operate any new facilities.

(Continued on Page 149)

Senator Couzens Writes Texas Governor on Panhandle-Detroit Gas Line Project

WASHINGTON, D. C., Apr. 1.—Senator Couzens, Republican, of Michigan, is very much interested in the proposal of Texas officials that a pipe line be constructed to serve Detroit and parts of Michigan with natural gas from the Texas Panhandle.

The senator has written a letter to Governor Allred of Texas in which he offers to assist in the attempt to get Public Works Administration funds for the purpose. In the letter attention was also called to the pending investigation of the natural gas industry, and Senator Couzens suggested that the information obtained by that investigation might be quite helpful to the Texas officials in furthering their plans.

The text of the senator's letter follows:

"My attention has just been called to your efforts in behalf of piping natural gas from the Panhandle of Texas to St. Louis and Detroit, so as to utilize gas now being wasted in your State.

"I have been advised that through R. B. Anderson, state tax commissioner, and Scott Gaines, assistant attorney general of Texas, you have taken this matter up informally with Harold L. Ickes, public works administrator, in the hope that P.W.A. will authorize a loan of some $60,000,000 for the project.

"I have for many years been interested in the possibility of obtaining cheaper gas for Detroit and Michigan. I should appreciate it if you would send to me any information which you may have about the project you are so actively advocating, and what prospects there may be of an early materialization.

"At this time I have pending before the Senate a resolution for an investigation into all questions relating to the production and distribution of natural gas. It would seem that this investigation would provide much of the information that would be necessary to reach a sound conclusion on the project you propose."

Western Pennsylvania Refiners Favoring Use of Selective Solvents

By R. C. CONINE

OIL CITY, Pa., Apr. 1.—While little doubt remains that the Pennsylvania grade oil refiners are definitely moving toward solvent extracted lubricating oils, probably the clearest picture yet presented of this modern development was that given before a record attendance of the Oil City-Titusville N.P.A. group here tonight by P. M. Robinson, research engineer of the Pennzoil Co.

The plan to hold monthly technical meetings in Oil City under auspices of the National Petroleum Association, and with the assistance of the Pennsylvania Grade Crude Oil Association was suggested last month when more than 100 refinery men from Bradford to Pittsburgh came here to hear a paper presented by Dr. M. R. Fenske, of Pennsylvania State College. The meeting was reported in these columns at that time. Following that meeting samples of 10 and 20 S.A.E. motor oils were sent to all of the members for testing and checking. Reports returned tonight showed a close check on all physical characteristics with the exception of viscosity, and, consequently, viscosity index. Russell Buckham, chairman of the Oil City-Titusville group, also announced that the Indiana oxidation test and the subject of additives have been suggested for discussion at the next monthly meeting. All of the groups are voting on a proposed visit to the General Motors laboratories in Detroit, or to the petroleum refining laboratories at State College. As most of the members have been in State College recently it is not surprising that the balloting thus far is favoring the Detroit visit.

In his discussion Mr. Robinson covered step by step all of the salient points to be considered by a refiner who is contemplating the installation of a solvent extraction plant. After sketching briefly something of the nature of the different types of selective materials and their proper application, Mr. Robinson, who spoke from personal experience, continued with an exposition which left little doubt as to why the refiner should be guided by the considerations enumerated. The full text of Mr. Robinson's discussion follows:

"Dr. M. R. Fenske has shown in recent papers how changing service conditions such as all-year operation, higher compression pressures, increased r.p.m., greater volumetric efficiencies of modern engines have made increasing demands on motor oil, causing us to discard old measures of quality such as flash, fire, viscosity and color, and to substitute viscosity index, viscosity-gravity constant, oxidation, sludging and carbonization tests.

"These indices and tests, in the final analysis, indicates the type of hydrocarbon molecules which form or predominate. The more paraffinic molecules are graded higher than the less paraffinic or naphthenic types. The designations "paraffinic" and "naphthenic" molecules, of course, are misnomers when applied to motor oils. Strictly speaking, all hydrocarbons suitable for lubrication are mixtures of paraffins and naphthenes; that is, naphthene rings with paraffinic side chains. The oils favored as lubricants are characterized by molecules having the least number of naphthenic rings and the highest percentage of paraffinic side chains. Another way of saying this is that the better motor oils show the lowest ratio of carbon to hydrogen. As hydrocarbons more nearly approach the paraffinic type, they exhibit greater resistance to change of viscosity with change of temperature, lower volatility and higher gravity for a given viscosity, greater resistance to oxidation and sludging, and lower carbon residue forming constituents.

"It has been known for several years that the premium quality of Pennsylvania grade motor oils is due to the preponderance of paraffinic type molecules. However, it has not been so generally known that these motor oils contain a small percentage of material lower in quality than the poorest lubricating oil produced in any part of the country. We find that with the removal of this material we are able to improve these indices of quality. We have been forced, therefore, to enter a new field in refining. Our old method of distillation, while able to segregate hydrocarbons as to molecular size, is useless for separation as to type.

Selective Solvents

"A selective solvent is one that exhibits a selective solution power for one type of hydrocarbon and leaves the other type merely saturated with the solvent. Therefore, there is a separation into two phases which may be decanted or centrifuged.

"The first question which the refiner must answer for himself is "What do I hope to accomplish by solvent extraction." There are many things that may be done with solvent extraction of Pennsylvania oils. The first and perhaps foremost is to produce a motor oil with an overall improvement in quality. If this is to be done, a solvent must be chosen that is only moderately selective and which possesses good solubility for intermediate products. The loss from depreciated oil will be higher in this type of operation than in other systems. Next, the refiner may wish to produce a small amount of a very high quality material with little depreciation in the major portion of the product processed. The refiner's choice would then be a solvent with poor selectivity and high solubility.

"The refiner may want to lower carbon residue and lower filtering costs. There is a similarity between filtering with clay and solvent extraction, so, fuller's earth may be almost spoken of as an extremely selective solvent with almost no solubility for oil. We know that carbon residue and color (chromophores) may be removed by filtering. We now believe these two characteristics to be caused by asphaltic matter in the oil. These products are of high molecular weight and are concentrated in the residual oil by distillation. For this reason little reduction of carbon residue and color, and increase in viscosity index is noted on filtering neutral oils, but an extreme reduction of these properties is effected by filtering residual oils, while a reasonably good increase in viscosity index is also obtained. It is probable that the earth is so selective that it will adsorb only the asphaltic constituents without affecting the naphthenic and paraffinic.

"Another example of an extremely selective solvent with no solubility for intermediate products, and one which works exactly opposite to the usual solvents, is propane. Propane will not dissolve any of the asphaltic constituents and will dissolve all of the paraffinic and naphthentic. Therefore, lowering of carbon residue and color may be accomplished with propane without significant increase in viscosity index. To sum up the various points which an operator taking up solvent refining must consider:

1. Suitability. Will the solvent selected do the work required with the greatest yield of product desired?
2. Cost and availability. Is the solvent priced reasonably and is it easy to obtain?
3. Stability and recoverability. Can the solvent be recovered without too elaborate process equipment and will the losses be low?
4. Physical characteristics of the solvent. Specific gravity, for quick separation; boiling point, so that the solvent may be distilled readily from the oil; latent and specific heat, so that the lowest possible amount of heat may be expended in recovering the solvent; volatility at atmospheric temperature, so that solvent is not lost through evaporation.
5. Toxicity of solvent. The solvent must be nonpoisonous.
6. Temperature of application.
7. Solvent to oil ratio. Losses and amount of solvent in process are determined by this factor.

Corrosion Problem

"An important solvent characteristic which must not be overlooked is its possible corrosiveness. Many solvents are either corrosive to ordinary materials in their original state or form corrosive compounds through decomposition. If this corrosiveness can be counteracted by simply neutralizing, it may not be a serious factor, but merely irritating. In solvents where corrosiveness is caused by decomposition, additional expense in first cost of the plant to prevent this is fully warranted. Where solvents are corrosive in their natural state special materials must be employed in construction. The temperature of application, whether low at-

(Continued on Page 64)

Important Oil and Gas Legislation Has Been Enacted by Kansas Legislature

TOPEKA, Kans., Apr. 1.— House Bill 279 becomes effective on and after July 1. It relates to the production and conservation of natural gas. The term "waste" as used in the act, in addition to its ordinary meaning, includes economic waste, underground waste, and surface waste. Economic waste as defined by the bill is the use of gas that is merchantable for light and fuel in any manner or process other than for light, fuel, carbon black manufacture, efficient chemical process or repressuring processes.

The State Corporation Commission is directed to make rules and regulations for the prevention of such waste, and for the protection of all water, oil or gas bearing strata. The commission is directed to regulate the taking of natural gas from any common source of supply so as to prevent the inequitable or unfair taking from that source of supply and to prevent unreasonable discrimination in favor of any one common source of supply as against another and in favor of any producer as against another in any such common source of supply. In promulgation of the rules, the commission shall give consideration to the well open flow and all other facts surrounding the production of gas.

An important feature of the bill authorizes the commission to make rules and regulations fixing the gas-oil ratio of production to be allowed from wells producing both oil and gas, and prohibits the daily taking from a gas well of not greater than 25 per cent of its open flow. The law excludes all wells having an open flow of 750,000 feet or less from supervision and regulation.

Senate Bill 255 is an act authorizing the governor to appoint a representative to meet with the representatives of the governors of other petroleum producing states for the purpose of agreeing upon a compact among such states affecting the conditions under which oil can be produced. After that compact has been agreed upon by three of the legislatures of the states of Texas, Oklahoma, California, Kansas and New Mexico, Congress must give its consent thereto.

House Bill 630 is an act ratifying the interstate compact to conserve oil and gas which was entered into by representatives of Kansas and the representatives of other oil producing states, at Dallas, Tex., on February 16. The representatives of the governor of Kansas were: Ralph J. Pryor, E. B. Shawver and T. C. Johnson of Wichita.

House Bill 278 is an act to permit in the interest of oil and gas conservation, the repressuring by air, gas, water or other fluid upon any oil producing sand, strata, or formation which has produced oil for the purpose of recovering any oil that might be contained therein. Kansas is the second state in the Union which has such a statute. Pennsylvania has had a similar statute since 1915.

The State Corporation Commission is directed to prescribe rules and regulations governing the repressuring by water or other fluid. Repressuring by air or gas is not controlled by the Corporation Commission, and that may be performed at the desire of the operator without any supervision by the regulatory body.

Senate Bill 195 relates to the abandoning of oil and gas wells and repeals the ancient laws upon Kansas statute books relating to the county plugging system. Wells will be plugged now under the direction of the commission and in the manner in which they prescribe and every protection will be given to fresh water strata. In order to carry out the provisions of the act, the Corporation Commission will designate agents to represent it, and such agents must have had at least two years of practical experience in oil production.

House Bill 280 is a law permitting the owner of any oil or gas well which produces salt water to return salt water to any horizon from which any salt water may have been heretofore produced. The return of the water shall be under the supervision and under rules and regulations prescribed by the Corporation Commission.

It is believed that these last three laws are all in the interest of oil conservation, and in the interest of protecting fresh water strata from pollution. These bills have met with uniform support by the oil industry, and the industry, no doubt, will lend every possible effort to make the laws workable.

More Drilling Necessary as Reserves Found Fail to Balance Consumption

By ANDREW M. ROWLEY

HOUSTON, Tex., Apr. 1.—Operating companies on the Gulf Coast and in Southwest Texas, as in other sections of the country, are becoming more and more "future crude oil reserves" minded. This feeling is intensified as results of last year's drilling are checked and studied closely. Despite a substantial increase in wildcat drilling in 1934 as compared to 1933, the percentage of "hits" is woefully small and the new reserves of crude oil found merely serve to emphasize the fact that still greater efforts will have to be made to assure the additional crude oil reserves executives of all companies realize must be discovered.

When Wallace E. Pratt, vice president and director of the Humble Oil & Refining Co., in charge of the geological, land and scouting departments, declared in 1931 that the petroleum industry must drill 20,000 wells a year (The Oil and Gas Journal, July 16, 1931, page 19) to maintain its necessary crude oil reserves, many in the oil business scoffed. They could see only East Texas, Seminole and Oklahoma City. They were worried by rapidly mounting crude oil production and Mr. Pratt's assertion the petroleum industry must continue to spend $500,000,000 a year for drilling alone was met in many quarters by cynical laughs.

It has been four years since Mr. Pratt made his memorable statement and during that four years consumption of gasoline in the United States established two new high record peaks (1931 and 1934); the industry has been drawing steadily upon its reserves of crude oil and only two fields of major importance—Conroe in the Gulf Coast and the Fitts Pool in Oklahoma—have been discovered.

Stocks Low for Investment

Investment in the petroleum industry is approximately $13,000,000,000. This investment depends, in the final analysis, on an adequate quantity of raw material—crude oil. Yet, despite the fact that for years the industry drilled an average of 20,000 wells per year, stocks of crude oil in the United States did not increase to any appreciable extent and just as soon as drilling campaigns were curtailed, these stocks of crude oil in storage above ground began to diminish.

Too many in the business were lulled to false security by figures on potential; with the idea that all the industry had to do to get millions of barrels of crude was to turn on valves and let the wells flow. Figures on potential meant nothing. Ask operators in the Oklahoma City Field, where hundreds of wells right now are unable to make even their allowables and these allowables are certain percentages of the potentials.

East Texas has been figured as having a potential of 10,000,000 bbls. or more daily, but efforts now are being made by conservative and legitimate producers to reduce the allowable production of that field from its present average of around 440,000 bbls. a day because even that production has resulted in a decline in bottom hole pressure proving the daily withdrawal is too high.

Improvements in methods of exploration and drilling have aided the industry in this situation and the application of geophysical methods, especially in the Gulf Coast areas, has grown by leaps and bounds. With an entire lack of surface geology on the Gulf Coast, geophysical methods of locating promising structures are a necessity.

While results obtained from geophysical exploration have paid for the cost of this work many, many times over, this is due largely to the fact the expense of geophysical work, while comparatively high, is but a drop in the bucket when compared to crude oil reserves discovered by such methods and practices.

The results of wildcatting during the past year are not calculated to give much strength to the assertion often heard that "whenever we need crude, all we have to do is to go out and drill for it and get it." These figures on last year's work prove conclusively that even the unusual increase in drilling activity last year with 50 per cent more wells completed than were finished in 1933, was not enough to provide the industry with sufficient new reserves to even balance the quantity used during that period.

These figures should be studied by every executive in the petroleum industry as a warning against the laxity in drilling operations and exploration work of the past few years for they show a very considerable increase in drilling activity is entirely justified in view of mounting consumption, steady withdrawals from storage and further depletion of known reserves, and that discoveries of new reserves not equal to existing and current requirements.

Wildcat Drilling Increasing

During 1934 there was an increase in wildcat drilling in practically every active section of the United States. This was true in the different areas in Texas and along the Gulf Coast in Texas and Louisiana and in Southwest Texas. There were 205 wildcats drilled in the Texas Gulf Coast during 1934, a wildcat being considered a test drilled a mile or more from known production. Of these 205 tests, only 18 found oil and only six of these were of importance. It is estimated these discoveries last year on the Texas Gulf Coast represent an increase in future reserves of approximately 100,000,000 bbls. of crude oil.

Such reserves, discovered in practically every instance, through the use of geophysical methods, certainly more than paid for the expense of such exploration but with less than one wildcat in 10 finding oil and the total new reserves totaling only about 100,000,000 bbls. in an area as active and as potentially productive as the Texas Gulf Coast, it is felt that even the greater number of wildcats drilled and the increase in the number of geophysical parties employed and engaged in exploration work were not sufficient to maintain the balance between crude oil requirements and reserves.

In the San Antonio and Laredo districts of Southwest Texas, these districts comprising the whole of that area generally referred to as Southwest Texas, there were 285 wildcats drilled in 1934 with four discoveries representing new crude oil reserves roughly estimated at about 35,000,000 bbls.

The Louisiana Gulf Coast was more fortunate in the matter of reserves discovered, five discoveries in that area out of 42 wildcats drilled adding approximately 150,000,000 to 175,000,000 bbls. to reserves, chiefly through the discoveries of such fields as Bosco, Roanoke and Gillis.

The East Texas area had a bad year in the matter of new discoveries and results from wildcat drilling. Of the 135 wildcats drilled in the East Texas territory (outside of the East Texas Field) only two found production and only one of these had oil production, with probably 20,000,000 bbls. added to crude oil reserves.

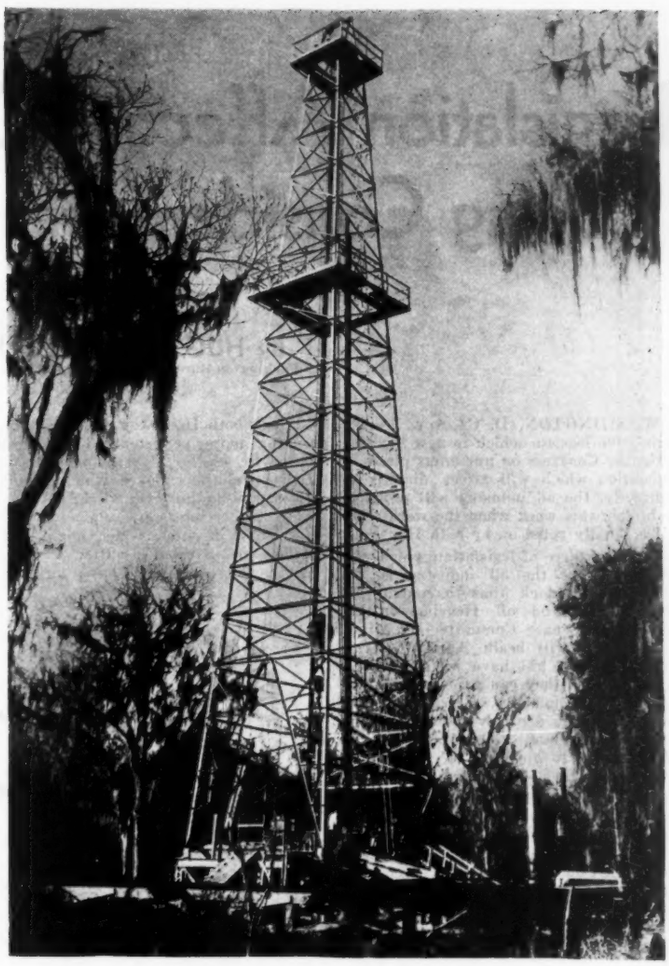
The record for West Texas shows 45 wildcats drilled in 1934 with six discoveries estimated as good for approximately 30,000,000 bbls. in new reserves.

New Consumption Records

In the North Texas area there were 575 wildcats drilled last year with 38 finding crude oil production but the discoveries did not cover much acreage and the total new reserves represented by these discoveries is estimated at only 10,000,000 bbls. In the Texas Panhandle none of the six wildcats drilled found crude oil production.

During the past five years crude oil withdrawals from storage total 80,788,000 bbls. while, during the same periods, there has been withdrawn from stocks 37,308,000 bbls. of refined oil products. Consumption of gasoline in the United States recorded a new high record for all time during 1934 and the consumption of kerosene during 1934 was greater than during any other period in the history of the oil business.

These conditions indicate very clearly the wave of increased drilling activity sweeping across so many areas which give promise of being oil productive will be felt more than previously in operations on the Texas and Louisiana Gulf Coast and in Southwest Texas. And the growth of the practice and policy of using geophysical methods will continue, especially in the sections named.



A wildcat amid the Spanish moss

Trailer bearing geophysical equipment being towed through a swamp in Coastal Louisiana to location

Legislation Affecting Oil Industry Being Considered at Washington

By HUGH D. MALLON
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., Apr. 1.—The legislative log-jam which is now blocking action by Congress on numerous pieces of legislation which will affect, directly or indirectly, the oil industry will probably be broken this week when the work-relief bill is finally voted on by both Houses.

The first piece of legislation which will directly affect the oil industry is the Thomas bill, which aims to control the production of crude oil. Hearings on this bill by the Senate Committee on Mines and Mining will begin April 16. Opponents of the bill have been promised time in which they can explain their position to the committee. Foremost among these opponents are Governors Allred of Texas and Marland of Oklahoma, both of whom intend to appear.

While it is conceded the bill might possibly be passed by the Senate, the consensus is it will be killed in the House, as Representative Cole, chairman of the petroleum subcommittee of the Interstate Commerce Committee, does not favor such legislation, it being his opinion that the states should be given an opportunity to work out their own problems through an interstate compact instead of through federal control. Practically all oil legislation considered by the House at this session will be considered by this subcommittee, and consequently is not likely to be considered favorably by the members.

Rayburn Bill

Of importance to the industry also is the holding company bill, hearings on which are now going on before the House Interstate and Foreign Commerce Committee. The bill as originally drawn would have excluded from the field all holding companies after 1940, except those that could prove that operations covered by them were confined to a contiguous territory and were necessary to the economical working of the utility company involved. Besides this, it was proposed that regulation of the natural gas industry should be placed in the hands of the Federal Trade Commission, which would have control of the regulation of rates, issuance of permission to enlarge present facilities, and building of new distribution plants, or facilities.

Representative Samuel Rayburn, of Texas, chairman of the committee, the other day admitted that he did not believe it would be to the best interests of the gas industry to have the regulation and control of that industry placed in the hands of the Federal Trade Commission. It is his opinion such regulation and control should be placed in the hands of some new agency or commission which would handle only matters pertaining to the gas industry, and with some knowledge of that industry.

However, it is believed that the bill in its present form will not be reported out by the committee. In its final form the bill is expected to be a regulatory bill, directed at holding companies, with a lesser amount of regulation over operating gas companies.

New Labor Bill

Whispers that a bill similar to the Wagner labor disputes bill will be given administration support and pushed through both Houses of Congress are becoming more persistent. This bill proposes to set up a permanent National Labor Relations Board which would be given jurisdiction over all labor disputes which affect interstate commerce, and as nearly all disputes, which might end in strikes or disturbances affect such commerce, the board will have jurisdiction over practically all disputes. The proposed bill defines the rights of an employer to encourage company unions, and a scrutiny of the sections on this subject show that the employer has no rights in the matter. It is defined as an unfair labor practice for an employer to interfere with, restrain, or coerce employes in the exercise of their rights to organize and bargain collectively through self-organization, to deter such employes from forming, joining or assisting labor organizations.

It is declared to be illegal for an employer to dominate or interfere with the formation or administration of any labor organization or to contribute any financial or other support to the furtherance of such an employe organization, except that an employer shall not be prohibited from permitting employes to confer with him during working hours without loss of time or pay.

Three Member Board Proposed

It is proposed that a board of three members be appointed for five-year periods to carry out the administration of this act, the members to be appointed by the President. The board shall have exclusive powers to prevent any employer from engaging in any unfair labor practice, as outlined. The power of the board shall be exclusive and shall not be affected by any other means of adjustment or prevention that has, or may be established by agreement, code, law, or otherwise. This would place the Petroleum Labor Policy Board in the position of having no authority to arbitrate, or rule on any labor dispute in the oil industry.

Byles and Lederer Voice Opposition to the Wagner Labor Relations Bill

WASHINGTON, D. C., April 1.—Opposition of the petroleum industry to the passage of the Wagner labor relations bill has been voiced by both Axtell J. Byles, president of the American Petroleum Institute, and E. R. Lederer, chairman of the labor subcommittee of the Planning and Coordination Committee. It is their contention that passage of a law of this type would prove detrimental to the present settled condition prevailing in the relationship of employer and employe in the industry.

Mr. Byles, speaking at the direction of the executive committee of the board of directors expressed the opposition of that committee to the bill with the following remarks:

"1. Despite its avowed declaration, the bill would not leave the individual employe or any minority group of employes free to choose the method of bargaining.

"2. The bill is wrongly premised in that it will foster discord and dispute between labor and management rather than further peaceful industrial relationship.

"The bill would inject an outside organization between the employes and their employer regardless of how effective and satisfactory their collective bargaining agency had been in the past. Experience has indicated that groups are always willing to pass the responsibility of working out a difficult problem to someone else. If the national labor relations board is established permanently, it can expect more and more problems to go to it without the parties concerned having put forth their best efforts to reach a satisfactory agreement.

"3. The bill proposes to direct by Government fiat the type of labor union or organization which may exist, thereby in effect creating a labor monopoly without authority in the government to regulate such a monopoly and compel observance of fair practices. Such a system once established would inevitably lead to further encroachment upon what are now recognized as the inherent rights of labor.

"4. Section 5 makes it an unfair labor practice for an employer in any way to restrain, supervise, or influence employes in their steps leading to organization, while paragraph 6 of this section provides: That nothing in this act shall preclude an employer and a labor organization from agreeing that a person seeking employment shall be required, as a condition of employment, to join such labor organization, if no attempt is made to influence such labor organization by any unfair practice. If such labor organization is composed of at least a majority of such employer's employes, and if the said agreement does not cover a period in excess of one year.

"The first five paragraphs of section 5 proclaim the duty of employers to withhold all influence over labor organizations; paragraph 6 abandons any pretense of securing the liberty of the employe and permits the employer to agree with the labor union to compel the minority to join the union. For freedom to contract there has been substituted compulsion to join a labor organization, and the employer, while restrained from advising his employes, is empowered to compel them even against their will to pay dues to a labor union and make it their only contact with their employer whether they like it or not.

"The National Industrial Recovery Act intended that the employe should be free to select his agency for collective bargaining. The employer is rightly restrained from using any undue influence. Similar restraint should be placed upon labor organizers if the employe is to exercise his freedom of choice.

"5. The bill confers upon a national labor board and its agents drastic, unwarranted and probably unconstitutional powers. As it stands, the bill is primarily framed to confer rights and power not upon American labor but upon the national labor board and upon labor organizers.

"The board could intercede to establish the units of collective bargaining or to render a decision on a controversy without invitation from either parties concerned, or if both parties had agreed to a procedure, including the selection of a board of arbitration. The national labor relations board might intervene to change the procedure.

"6. The bill abrogates existing contracts between employer and employes without regard to their merit or benefit to either or both parties to the contract.

"7. The bill provides that employes can confer with their employer without loss of time or pay. This provision would probably be adequate if the employes were confined to a single plant. However, in the oil industry employes and their representatives are scattered over wide areas which makes it necessary to incur travelling and hotel expenses in connection with these conferences. In addition to this the employer should be permitted to pay the expenses of conducting an election if the employes or their representatives make such a request.

"8. The effect and probable intent of the bill is to destroy what is known as 'employe representation plans,' many of which have existed satisfactorily to workers in the petroleum industry for a long period of time.

"We believe that the President, in his settlement of the recent automobile industry situation in Detroit, has written for American labor and employers alike the essence of any desirable labor legislation pertaining to collective bargaining."

Mr. Lederer, pointing out that President Roosevelt at the time of the adoption of the oil code, probably believed that the oil industry was unique in its various aspects from other industry, established a separate administrative agency, which therefore is conclusive evidence, Mr. Lederer said. That a standardization of all industry under the proposed bill would not carry out the tenets of the President's program.

The only interpretation which Mr. Lederer is able to place upon the law is that the United States Government is placing itself behind the American Federation of Labor. In the case of the oil industry the Oil Workers Union, which represents only a very small minority of employes, and this will be done, says Mr. Lederer, in spite of the statement of the recovery administrator that "this administration is not to be used for the unionizing of any industry."

"Under the terms of this bill the company union will be outlawed, and all the benefits which such organization actually have for their employes will cease, with the resultant deprivation of advantages to the employes enjoying such rep-

(Continued on Page 64)

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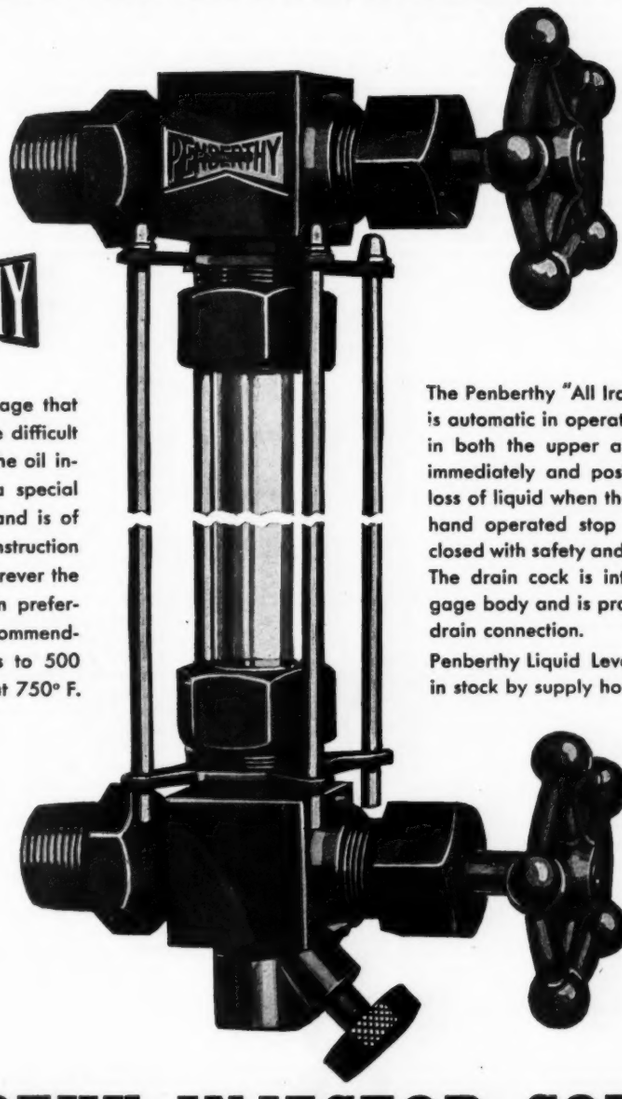

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Different Methods in Setting Screen in High Pressure Wells on Gulf Coast

With deeper producing sands being cored in the Gulf Coast, and higher bottom pressures being recorded, ways and means of drilling into these deep sands, and of setting liner and screen in such a manner as to assure successful completions, has occupied the attention of many specialists during the past two years.

Drilling mud has, of course, constituted one of the major problems involved in the discussions and experiments. The task of holding heavy formation pressures under control with heavy drilling muds has not been difficult to accomplish. The problem of holding high pressure, deep lying sands under control with types of mud which, while sufficiently heavy to do their work, also combine characteristics which minimize the adverse effect of any mud on producing sands is, however, still a moot subject.

Methods of controlling high gas pressures from sands lying above the prospective producing horizon, and methods of controlling high bottom hole pressures from the producing horizon, while running, landing, washing and setting the oil screen, involve quite different problems. Toward the solution of sound methods, important progress has been made, resulting in safer, more satisfactory and more economical completions.

The major problem in making a satisfactory screen setting in a deep Gulf Coast well, in which a long column of even moderately heavy mud has been carried on the producing sand for a period of hours, is to obtain a thoroughly clean washing of the face of the producing sand and of the outside of the well screen, before setting liner packer. Heretofore, without adequate surface control equipment, correlated in design for use with liner setting tools, the job has been extremely ticklish involving a nicety of judgment on the part of the operator as to how far he dared go in washing a well before setting the liner packer, flanging on christmas tree, and washing the well in through the christmas tree. As is well known, washing done after setting liner packer has little or no effect in cleaning either the face of the producing sand, or the outside surface of the screen. Until recently it has been impractical, because of the hazards involved, to attempt a thorough washing of the sand and the outside of the screen. Only a slight unbalance between the hydrostatic pressure on the sand and the formation pressure is necessary to start a typical Gulf Coast well to flowing.

Surface Control Equipment

In recognition of the need for new methods to cope with the problems involved, petroleum and equipment engineers have collaborated for the past several years to perfect new types of surface control equipment, and correlated liner setting tools. Double valve set shoes, with positive means of assuring shutoff on the lower end of the screen, have been developed, and their use has considerably reduced trouble with sanding of screen on the inside. It is now possible to go into a hole with screen, liner and setting tool on the producing tubing string, then to wash the hole clear to the surface if desired, completing the operation of setting the liner and screen after the well has started to clean itself and come in. Positive and secure control may be maintained at every stage of the operation and much better completions, due to clean producing sand and clean screen, are being chalked up.

Properly to evaluate the new methods employed to land liner and screen, and in washing a deep well in the Gulf Coast, it is interesting to examine, briefly, the conventional or customary practice. Ordinarily, liner and screen was run to bottom on the regular drill stem, usually through a blowout preventer installed on the oil string. On reaching bottom, pipe was picked up and the well washed until mud surrounding the screen had presumably been displaced by clear water. Liner packer was then set, and drill stem carefully pulled out of the hole. Tubing was then run in and landed at the desired position in or above the liner. The well then was unprotected against blowout while blowout preventer was removed and christmas tree flanged on. The well was washed through the christmas tree until it came in, if it came in. If it failed to flow naturally, frequently the swab was resorted to with a view of unloading the pressure on the producing formation sufficiently to enable the well to kick in. The necessity of swabbing some wells clear to bottom, which subsequently started flowing and eventually recorded high formation pressures, clearly indicated the detrimental effects on the producing sand of insufficient washing, and probably also the adverse effects of heavy drilling muds having penetrated the producing formation.

View of a small but accurate scale model of the type of christmas tree used by operators employing the C. C. Brown method of setting screen under control so that well may be washed until it starts flowing before liner packer is collapsed and sealed. This head is an adaptation of the Hughes-Brown retractor type head, and is furnished by the Hughes Tool Co. Note special hanger beside head

Mudding-Off Influence

It is now generally recognized that, even with the most scientific drilling mud which can be employed to drill in with, the producing sand is subjected to a mudding-off influence which can best be offset by long and continuous washing with clear water or other suitable fluid. To permit this to be done, while at the same time maintaining positive control of the well at the surface, several methods are now being used by a number of Gulf Coast operators.

One of these methods embraces the use of set shoes, liner packer and liner setting equipment designed by C. C. Brown of Houston, in connection with surface christmas tree equipment furnished by Hughes Tool Co. The accompanying illustration, a picture of a small model of the surface equipment, shows the use of stuffing box connections on top of a Hughes Brown retractor head, swivel connections being made on the joint of 2½-inch pipe extending above the head. When this method is used, a master gate is made up on the oil string, with a special casing nipple between the top collar of casing and the master gate. This nipple has an inward bevel on a taper. Blowout preventer, of the type selected by the operator, is flanged on the master gate. Tubing with set shoe, screen, liner and liner packer and setting tool is now ready to be run in the well. When screen reaches bottom, tubing string is suspended on the special nipple below master gate by means of a special tubing hanger. Lift joint is now backed out of the top connection of the special hanger, and the master gate is closed, leaving the well under complete control while removing the blowout preventer. After blowout preventer is removed, the christmas tree is flanged to master gate, with safety stuffing box on top of tree. Now a lift joint of pipe is connected to bottom of the swivel and inserted down through the stuffing box, master gate is opened, and lift joint is again made up in the special tubing hanger. Washing of liner behind the screen may now be started, complete control being maintained. After sufficient washing is done, tubing is rotated to the right to release tubing from liner and close back pressure valve in the set shoe. Positive notice that this operation has been completed is given by the pumps being stopped. Leaving steam or power on the pumps, tubing is picked up out of the set shoe, and pumps voluntarily start circulation again on inside of liner. Tubing is now picked up, liner washed inside as far as the operator, and with the special setting tool the liner is sealed to the casing. Tubing is now suspended again in special casing nipple under master gate, the lift joint is released by backing out of special hanger, and is pulled up through stuffing box. Top valve of christmas tree is now closed, and well is in position to flow without added connections.

Procedure in Soft Formation

Several operators are using this method and equipment in a slightly different manner than above described. The variation in practice is dictated, to some extent, by the character of the producing sand. If it is fairly well consolidated, and likely to hold up without caving during the period required for removal of the blowout preventer and installation of the christmas tree, then the previously described routine is used. If, however, the producing sand is revealed by cores to be soft, and likely to cave while surface control equipment is being changed, then procedure is as follows: When liner and screen reach bottom, special tubing hanger is placed in the string, preventer is closed around the lift joint, and clear water is pumped around the liner until heavy mud has been raised 1,500 to 2,000 feet off bottom of the hole. Liner is then released from tubing and back pressure valve in set shoe closed as previously described. Packer is then set, and tubing pulled back through the preventer until the special tubing hanger is in position to be suspended under the master gate. Lift joint is then removed, and master gate closed. Preventer is removed, and christmas tree flanged on. Retractor tubing stem is now run down against seat in tubing hanger, after master gate is opened, and remainder of mud is washed out through the casing by pumping through the tubing with clear water. This practice permits washing as soon as the setting string reaches bottom, and leaves a much shorter interval for hole to cave between the time producing sand is drilled, and the time washing operations start.

One major company, employing the first described method of setting its wells in high pressure areas, installs christmas tree upon landing screen and liner, then washes well until they kick in ahead of the pumps, at which time liner packer is collapsed, and the tubing string suspended. Well is held under control at all times. Should it kick hard enough to threaten damage to the screen, choke is installed on the discharge line, and well is permitted to clean itself under choke control while screen setting is being completed.

High Pressure Encountered

This method has been used in wells in the Roanoke, La., Field, which were completed below 8,700 feet, and which were brought in under perfect control and which flowed without any assistance from the swab. One of these wells recorded 3,400 pounds pressure. A well at Eureka Heights which was completed below 7,600 feet recorded 3,000 pounds pressure on completion. It was washed in before liner packer was set.

A variation of the Brown method is accomplished as follows: When plugs are drilled, and sand penetrated to desired depth, lower half of a boll-weevil type tubing head is screwed onto casing. This head has a tapered bowl which permits use of slips with which to set tubing, and is also adapted for use of a boll-weevil type of preventer while running tubing. After screen has been landed on bottom, the upper half of christmas tree, with stuffing box above, is telescoped over a litt joint and a special tubing hanger and seal is screwed between this lift joint and the tubing, and then run into the casing as far as desired. Upper part of head is flanged to lower half, all flow line connections made, and washing may be started. After liner is completely washed, tubing is released from the set shoe, back pressure valve is closed, packer is sealed to casing, and special tubing hanger and seal is pulled back up into tubing head where it is automatically supported and sealed either on slips or a shoulder, at the option of the operator.

Another method employed embraces the use of a specially designed tubing head and correlated liner packer setting

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tool perfected by the Texas Iron Works of Houston. When the oil string is cemented, the bottom half of the special tubing head is made up on the pipe, and casing outlets are flanged up to meet individual operator's requirements. Blowout preventer, of whatever type is most favored, may then be flanged on top of lower half of tubing head. Cement plugs may then be drilled, and oil sand penetrated to desired depth.

With the hole ready for setting of screen, the set shoe, screen, liner and liner packer are made up on the tubing string. Suitable swedge is used between setting string and upper end of setting tool. Liner is then run to bottom, and upper end of tubing is spaced so that upper collar (which in this method is a special safety collar used later to suspend the string) is six or eight feet below the casing head. Upper casing head assembly is now ready for installation on lower half of casing head, with a 2½-inch hydraulic lift joint inserted through it and extending above the stuffing box on top of the cross on the upper extremity of the christmas tree. Christmas tree may now be made up tightly, with all valves, chokes, flow lines in place if desired. Using the top of the hydraulic lift joint for swivel connections, well is now ready to be washed thoroughly. Since casing outlets are valved and closed, well can not kick in through the casing. And, the stuffing box on top of the christmas tree obviates any loss of control through the christmas tree assembly. More cautious operators may use a special valve between lift joint and swivel if desired.

The well may now be washed to meet the requirements of the individual operators—even to the point of bringing clear water to the surface. This gives the outside of the screen, and the face of the producing sand a thorough scouring before liner packer is set. When washing is completed, packer is set and tubing picked up and suspended on the special collar by the slips in the upper casing head assembly. It will be noted that the special collar shoulders against the inside of the upper section of the casing head, preventing the tubing from being blown out of the well, regardless of pressure. The special safety collar is designed to enable packer to be set with right hand rotation, and yet permits the hydraulic lift nipple to be very easily backed off by left hand rotation.

When tubing has been suspended on slips, top lift joint is backed out of special safety collar by left hand rotation and pulled above main control valve of christmas tree so that valve may be closed, and stuffing box removed. Bull plug with gauge is now installed on top of tree. Main gate valve may now be opened and well permitted to clean itself and be put on production. It will be noted that the special safety joint used is packed off to the outer well of the upper half of the casinghead, the slip bowl being free to move down and compress the packing. This design is incorporated to permit the well to be killed by making a connection to the casing outlet in event anything should happen to the christmas tree connections, or the well in any manner get out of control.

Modified Method Successful

A modification of this method has been used for some time by a major company in its Louisiana operatons, and which has proven highly successful. Its bottom hole equipment consists of the regular screw through type of packer and positive seal set shoe with the addition of flow back valves made by the Texas Iron Works, which are inserted in the wash pipe, a few feet off bottom. Their well head completion equipment consists of a standard McEvoy type tubing head in which slips are provided above the main stuffing box of the tubing head. When the screen has reached bottom the top section of the christmas tree is installed and the tubing extension, which projects through the tubing head, is so spaced that after the packer has been set and the tubing lowered so that the compression head of the setting tool is in sealing engagement with the top of the packer, the master tubing valve is a few inches above the slips of the tubing head. This completion practice permits the washing of the well through the regular wash pipe and after setting permits the oil to flow into the wash pipe through the special flow back valves. By leaving the compression head of the setting tool in sealing engagement with the top of the packer, water is trapped around the tubing and the casing which affords protection from high gas pressure leaking through joints in the oil string. It is understood that means are provided in the tubing line which may easily be operated to shut off the flow through the tubing and the inside and outside of the tubing is sealed in case the christmas tree may become damaged. This procedure was developed for the purpose of minimizing the hazards which may arise on wells that are located in the bays and marsh lands of the Louisiana Gulf Coast during tropical hurricanes. It is seen by this development that aside from being able to set the packer after the well has begun to flow great protection is obtained from abnormal future production hazards and is indicative of the possibilities of safer and more economical completion with present standard equipment.

A third method in use in the Gulf Coast was worked out by engineers of J. H. McEvoy & Co., Houston. The setting procedure is similar to the previously described methods. When bottom is reached with screen, a special space nipple is installed which permits connection of a special tubing hanger, to which is connected a lift joint adapted to extend through a stuffing box in the upper section of the christmas tree sufficient to permit total packer setting operation. Lift joint is used to raise tubing, after packer has been set, and seat special hanger in christmas tree. Thus, when washing operations are ready to start the christmas tree has been installed with a stuffing box around the lift joint, permitting washing operations to proceed and the well to begin flowing prior to setting of the packer. This method, too, enables the operator to have full control over his well, even though it be flowing, before the packer is set and the tubing landed.

Bottom Hole Chokes Have Numerous Applications in Gulf Coast Wells

The salt dome fields of the Gulf Coast are spaced between the outcrop of the Miocene and Pliocene formations and the shore line of the Gulf of Mexico. These domes are deeper seated the nearer they are to the Gulf and it has been noted that as greater depths of pay formations are found in these wells the ratio of gas to oil and the character of the oil materially changes.

Those salt dome fields near the outcrop have relatively heavy oils and low gas oil ratios.

Fields found in the middle zone between outcrop and Gulf Coast shore line have higher grade oil and higher gas-oil ratio. Those fields that have been opened at depths below 6,000 feet and are located near the shore line have high gas-oil ratios, in fact some of these wells are referred to as "distillate wells" and they have caused considerable difficulty in producing them in the usual manner through tubing.

It is a well-known fact that expanding gas will reduce the temperature of the surrounding medium, of gas, oil or water, and change flow conditions. Where this expansion takes place in a well that has its annular space filled with oil it is a very common thing to find that the paraffin in the oil is precipitated in both the tubing and the annular space between tubing and casing. Where the space back of the casing is filled with water, freezing of this fluid occurs with damage to the casing. Where gas is present the cooling will cause the precipitation of gasoline fractions.

The most serious trouble is freezing water that accompanies the oil and gas from the producing formation. This has occurred in many Gulf Coast wells with damaging results. When the plug of ice is formed pressures in the tubing build up and if the fittings are not sufficiently heavy to withstand the accumulated pressure blowouts occur and serious damage may result.

If this gas can be expanded deep in the hole where the formation temperatures are sufficiently high and the volume of heating medium surrounding the tubing enough to furnish heat fast enough to satisfy the demands of the expanding gas it is possible to produce such wells without trouble. The Otis bottom hole removable choke is being used to secure these results and has been giving excellent service. The bean within this type of choke can be varied in size to suit the particular well's characteristics. At the well head it is usual practice to install lubricator, adjustable choke and mixing valve so that the whole product of the well is handled without temperatures being reduced materially.

Bottom hole chokes are run upon steel line and may be set at any desired depth within the tubing. The depth selected for placing the choke depends upon well characteristics and it may be changed from time to time as needed. When this choke is set and the surface connections completed it is usual practice to gradually open the adjustable choke at the surface and permit the well to flow at an increasing rate until its maximum safe capacity is reached. By this method it is possible to keep check upon drop in temperatures and regulate the flow rate to keep the temperature far above freezing.

Bottom hole chokes and mixing valves are used in many connections at Gulf Coast wells and one other novel use has been found for this removable device, which is converted into a plug when desired by using blank bean, by using a choke that is not provided with hole through which oil and gas could escape from the well.

Many wells along the Gulf Coast are located upon piling and mats out in the waters of the Gulf. In these same waters there are oyster and shrimp beds and oil spilled over the surface of these waters will gradually accumulate along the beaches and in time contaminate the oyster and shrimp beds. Damage suits result and to avoid them it has been found that wells located out in the Gulf that can be damaged by high wind and waves can be prevented from running wild through breaking of surface connections during the storm by providing a blank removable choke that can be run to some distance from the top of the tubing to plug the well temporarily.

To secure this protection the well head is provided with a small hand operated reel upon which is wound several hundred feet of steel line. This wire passes over a small sheave attached to the top of the tubing. The removable choke with blank bean is hung on the line below a packer within the upper portion of this top joint of tubing and can be lowered quickly.

When storm warnings are sent out the pumper in charge of wells in the danger zone lowers the chokes well below the water level outside the casing. This shuts off the flow of the well through tubing until this choke is withdrawn. The casing is protected by heavy fittings and is surrounded by cement and the danger of the well flowing wild through the annular space between tubing and casing is reduced to a minimum. It is also common practice to provide packer for the bottom of the tubing which cuts off flow into the annular space outside of tubing.

Frank B. Taylor Dies After Brief Illness

CASPER, Wyo., Apr. 1.—Frank B. Taylor, staff correspondent in the Rocky Mountain territory for The Oil and Gas Journal and The Oil City Derrick from 1918 until 1926 and state oil and gas supervisor for Wyoming from 1926 to 1933, died here yesterday after a brief illness. He was taken to a hospital two

FRANK B. TAYLOR

weeks ago suffering from ulcers of the stomach. At the time of his death he was associated with the Sinclair Wyoming Oil Co.

Mr. Taylor was born September 13, 1882 in Oil City, Pa., the son of Frank H. Taylor, who was editor of The Oil City Derrick. He was educated in Oil City and at St. Johns Academy in Washington, D. C. Shortly after leaving school Mr. Taylor entered the oil business and operated at Parkersburg, W. Va. for a time before going to Wyoming. He is survived by the widow Mrs. Lelia E. Taylor; a brother, Harry P. Taylor of Pittsburgh; two sons, Frank B., Jr., of Borger, Texas, and Don D., of Casper; and a daughter, Virginia, of Casper.

Alberta Oil Prospects Discussed by Calder

Before a committee of the Alberta legislature recently, W. Calder, director of the petroleum and natural gas division of the provincial lands and mines department, gave his views as to oil development and prospects in the province. He expressed the belief that oil extended from the south into Canada, and that oil would be found in other parts of the province in quantities that would make the present discoveries look small. In northern Alberta, the limestone has not been explored to any extent; nor had development work been really efficient. Discussing the Wainwright Field, he stated that, testing the first two wells for the Dominion government in 1926, he found that they gave 30 and 35 bbls. a day of 18 Beaume crude. He added that 12 wells had been started, all of them contaminated with surface water. "There was a water horizon at 400 feet and they were destroying the farmers' water. Steps were taken to prevent water getting into the new wells with the result that the Sasko-Wainwright well has given 20,000 bbls. with only 1 per cent of water. The gravity has increased in quantity to 20-21 degrees. We had to take over Onalta's No. 1 for a time and it has an oil of 22 Baume.

"The present Wainwright refinery handling about 200 bbls. a day got 8 to 10 per cent of gasoline, but with a cracking plant considerably more gasoline could be obtained. The field was a shallow one, a fair potential producer but not spectacular.

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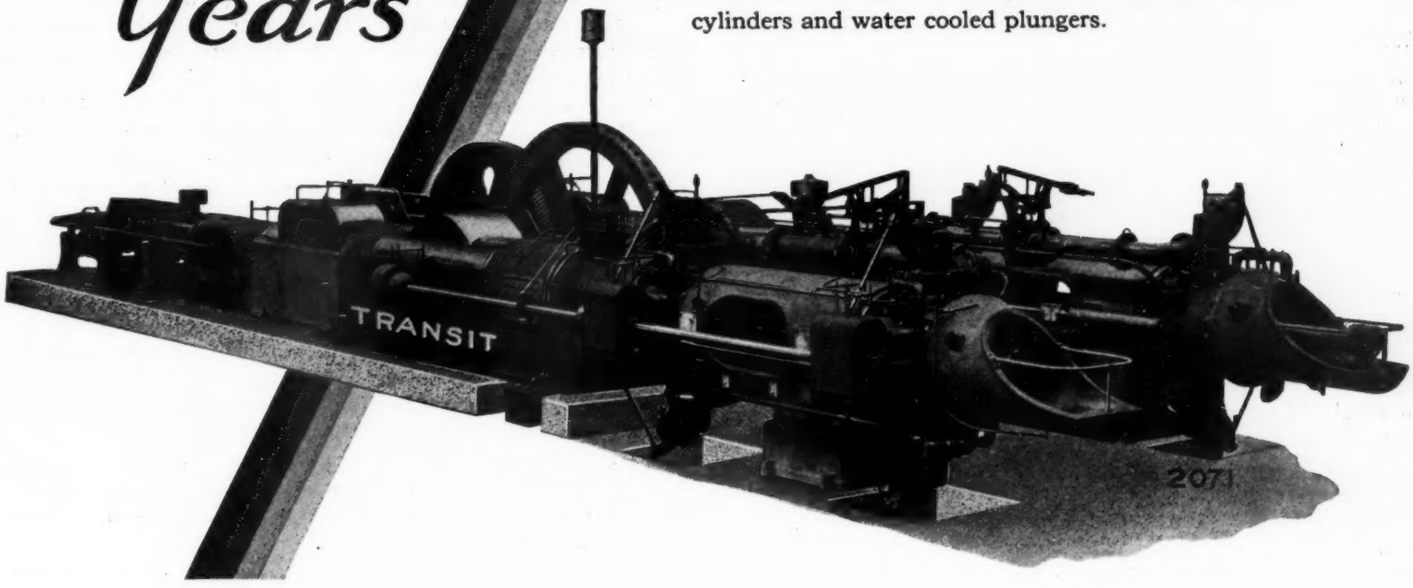

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Burning Down the House

The folly of burning down the house to get rid of the mice is proverbial. The country at large is beginning to awaken to the realization that this is exactly what Congress is being asked to do in the Rayburn bill for the abolition of public utility holding companies.

There is no doubt about the mice, no doubt whatever that flagrant abuses have been masked in the operations of many holding companies. But the remedy is not to destroy the entire holding company structure, to burn down the house, when it is so much simpler and saner to exterminate the abuses.

The legitimate and essential function of the holding or financing company is well illustrated in the natural gas industry. Natural gas fields are not found at the consumers' back door. Usually they are remote from consuming centers.

Ordinarily they are discovered as an incident to oil development. It is the duty of the oil producer to see that the gas is not wasted and to provide, if at all possible, for its utilization. This has required large expenditures in the construction of transportation systems to communities of consumers.

Producers interested in oil and with their capital invested for that purpose have to look elsewhere for money necessary to take their gas to a market. An investment company, or holding company, as you will, can assume that obligation, taking into account the heavy initial cost, the probable market and the resulting depletion of the gas supply.

It has been because of companies interesting the public in such investments that the country has within recent years been gridironed with great natural gas pipe lines, creating an outlet for great gas fields that seemed too remote for any present use and supplying distant cities like Chicago and Denver with an economical and convenient fuel that they never expected to enjoy.

The manufacture of pipe and equipment for these great gas systems was a very considerable part of the business of the heavy industries before the depression and their transportation furnished revenue to the railroads, both the railroads and the heavy industries being slowest in getting back to normal.

The threat of the Rayburn bill is destroying public interest in enterprise. If, instead of enacting specific remedial legislation to stop abuses and prevent them in the future, Congress is induced by a few "wisecracks" to dynamite the whole utility structure, what effect can the wiping out of the public's investments in that field have upon the progress of national recovery?

The loss of not merely earnings but of capital itself will put a crimp into buying power beyond calculation. Yet the country has been told that the prime purpose of the recovery program has been to increase consuming power, to create demand for more production and thereby increase employment.

It is idle to say that no real values will be destroyed. The same might have been said of crashing markets in that disastrous fall of 1929 but the destruction was none the less real to all of us.

Right at this time when the people are taking sober second thought and reappraising the general situation, no longer quite so sure of being on the right road, and beginning to ask questions that demand an answer, the country looks to Congress to see that there is no rocking of the boat.

Experience with such governmental control of business as we have had has not encouraged the country to welcome more of it. People are anxious to get through with this period of experimentation and get settled down so they can do some planning of their own. Government planning runs too much to labyrinths; easy to enter but hard to get out of.

There is a lot more to the Rayburn bill than abolition of holding companies en masse. It furnishes a very complete diagram of how far governmental regulation and restriction is to go unless Congress forbids. All utility companies, for instance, would be required to buy from, exchange with or transmit for any other party and could be ordered to extend, improve or change facilities and establish interconnection with the facilities of other persons.

On the other hand no utility could, without official approval, acquire property, construct, complete, extend or improve its facilities.

The oil industry can figure what this would do to the natural gas branch and, if it is far sighted enough, it may foresee what might happen to the oil industry and all other industries once the theorists at Washington were firmly seated in authority.

Administrator Ickes' threat of treating the oil business as a public utility has not been forgotten, by either the industry or the administration. It takes on a more sinister cast in view of the sort of control set up in the Rayburn bill.

The fiercely competitive units in the business which have persistently rejected all efforts for co-operation, insisting upon their assumed right to do as they please, ought to look into the Rayburn proposal and learn what may be in store for them if disorder in the oil industry affords a pretext for the government to declare it a public utility. And if oil, why not any business?

It is this aspect of the Rayburn bill, as well as its disruptive effects on the utility companies and those who have their savings invested in them, that is alarming the ordinary man who asks where we are going.

We have been so busy running away from the "Big Bad Wolf" that we took no account of direction. Now we find we have been running around in circles in an economic wilderness.

We had largely lost our sense of proportion. We had become extremists. If we found anything to condemn we condemned wholesale. If we fell for any fad we swallowed hook, line and sinker.

We are getting over that. We would like to keep the house while we are getting rid of the mice.

We have been too prone to approve proposals because they had been given a popular tag, without taking the trouble to look behind them and see what they meant. Codes of fair competition sounded millennial in the abstract but how have they worked out? Abolishing holding companies is designed to catch the crowd but how will it work out?

One great flaw in the administration has been too much theoretical generalization and too little practical experience. The Rayburn bill seems another example of aiming at the moon and breaking a window.

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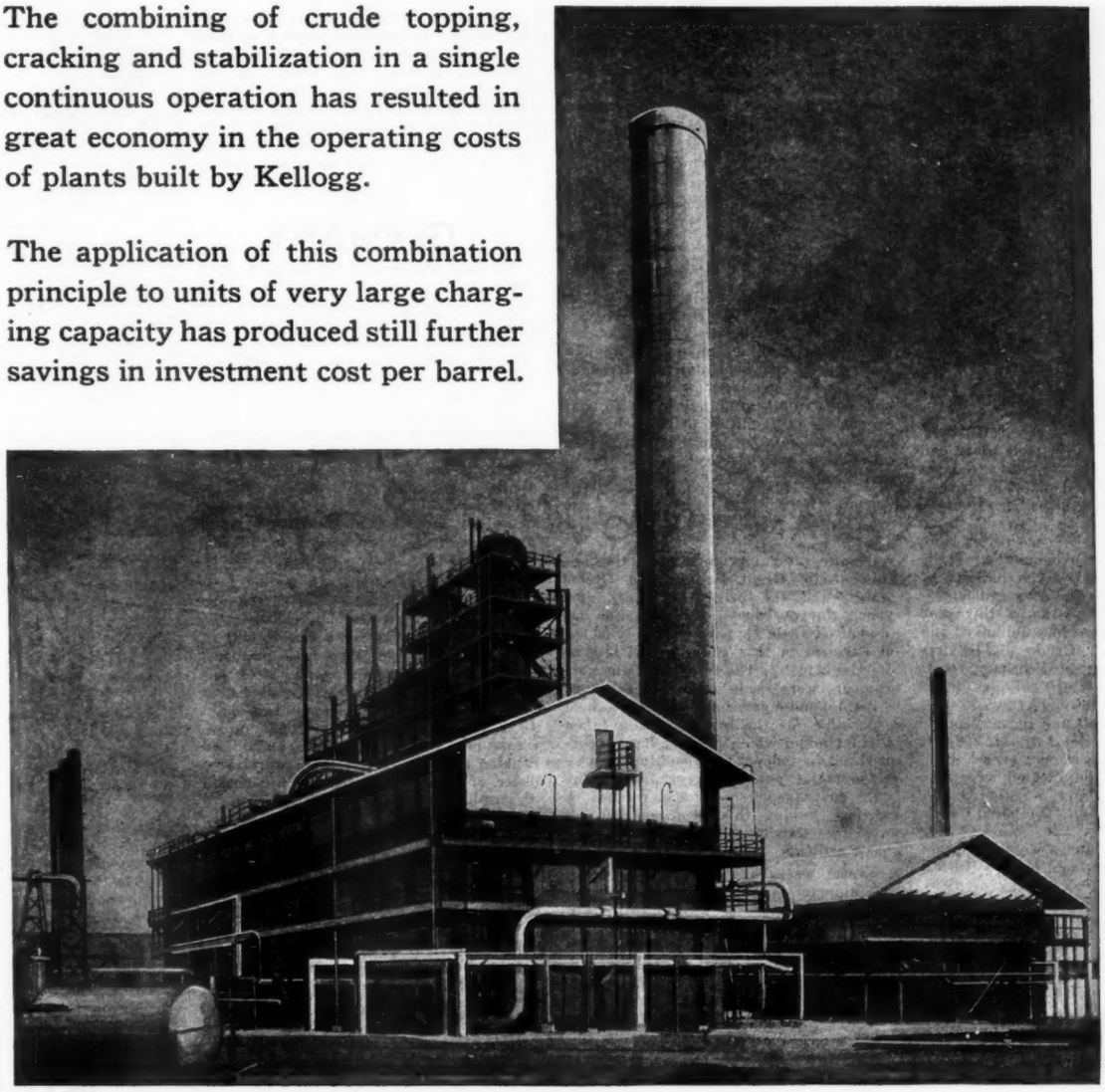

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NEWS FROM FOREIGN LANDS

GREAT BRITAIN

Government reports covering imports into the United Kingdom for the first two months of this year indicate that consumption of petroleum products will again show a substantial increase during 1935. The consumption in 1934 established a new yearly record and the Government reports show that for January and February the imports which are an accurate gauge of consumption were 7.5 per cent greater than the same period in 1934.

For the first two months of 1935 and 1934 the imports by products were as follows: (data in imperial gallons).

	1935	1934
Crude oil	73,939,000	65,886,000
Gasoline	188,555,000	167,095,000
Kerosene	38,999,000	46,302,000
Lubricating oils	12,897,000	17,971,000
Gas oil	26,561,000	21,920,000
Fuel oil	102,768,000	93,505,000
Misc. oils	93,000	43,000
Total	443,812,000	412,922,000
Value (pound sterling)	5,145,454	5,277,000

This table shows that imports of all the principal products increased with the exception of kerosene and lubricating oils. Expressed in American barrels of 42 gallons the imports the first two months of this year averaged 215,000 barrels daily against 200,000 bbls. for the same period in 1934.

In this connection it is worthy of note that refineries are increasing their crude runs to stills. Based on the imports of crude oil the crude runs averaged 36,000 bbls. the first two months of this year against 32,000 bbls. for January and February of 1934. Crude oil imports showed a large gain in February totaling 47,214,000 imperial gallons or a daily average of 48,200 bbls.

Imports of crude oil and refinery products in February totaled 232,256,000 gallons, a gain of 20 per cent over February, 1934. Imports of fuel oil were 58,766,000 imperial gallons, a gain of 20,000,000 gallons when compared with February, 1934.

The following countries were the principal suppliers of products for the United Kingdom the first two months of 1935 and 1934: (data in imperial gallons):

CRUDE OIL

	1935	1934
Mexico	19,026,000	11,188,000
Persia	16,018,000	43,454,000
Peru	12,035,000	7,188,000

KEROSENE

Persia	23,868,000	15,170,000
Rumania	7,355,000	7,554,000
Mexico	6,381,000	2,867,000
U. S. A.	395,000	15,475,000

GASOLINE

D. W. I.	75,999,000	76,034,000
Persia	41,214,000	16,585,000
Rumania	15,873,000	10,689,000
U. S. A.	15,867,000	21,171,000

GAS OIL

U. S. A.	8,401,000	7,581,000
Rumania	4,450,000	8,591,000

FUEL OIL

D. W. I.	48,065,000	43,777,000
Persia	27,670,000	10,839,000
Mexico	16,121,000	19,019,000

FRANCE

The crude to stills of French refineries has increased more than 40 per cent over the past year based on reports of the government covering imports of crude and refinery products for January. The crude oil imports in January totaled 403,238 tons and 292,773 tons in January, 1934. In barrels, the January crude oil imports averaged 91,000 bbls. daily which compares with 66,100 bbls. in January, 1934. Assuming that all the imported crude was run to stills and adding 1,500 bbls. daily of crude produced in France and the average runs were within 7,500 bbls. daily of the 100,000 bbls. daily which has been the goal of French refining since refinery construction started on a large scale four years ago. At that time crude runs to stills were approximately 5,000 bbls. daily.

The increased crude oil runs to stills at French refineries have brought large decreases in the imports of finished products. This is shown in the following table giving the imports in January, 1935, and 1934 (data in tons):

	1935	1934
Kerosene	1,162	5,935
Gasoline	58,063	109,061
Lubricating oil	9,606	12,801
Gas oil	17,629	36,239
Fuel oil	23,286	24,540
Road oil	1,077	851
Total incl. crude oil	514,061	482,200

Calculated in barrels the January imports averaged 116,000 bbls. daily, a gain of 7,000 bbls. daily over January, 1934. The gasoline imports in January averaged 13,100 bbls. daily, a large decrease when compared with the 24,300-bbl. daily total in January, 1935. The expansion in facilities at French refineries to manufacture lubricating oils accounts for the decrease in imports of that product.

MANCHUKUO

Despite official protests from the governments of Great Britain and United States, and the private interests concerned, the government of Manchukuo has announced again that its monopoly of the oil business in that country will become effective April 1. The protests of the governments were made several months ago to the Japanese government which is held responsible for the official action taken in Manchukuo which has not been recognized as an independent country by any of the major powers except Japan. The latter government so far has refused to interfere, taking this position that all complaints should be taken with Manchukuoan officials.

Several weeks ago Manchukuoan officials announced the terms of the monopoly and the quantities which the private interests which have been operating in that country for several years, would be allowed to furnish. The actual distribution will be in control of the government although facilities of the private interests are being used. It is understood that the allocations were not satisfactory to the oil companies involved. The four principal interests which have been distributing in Manchukuo are: Standard-Vacuum Oil Co. (Standard Oil Co. of New Jersey and Socony-Vacuum Oil Co., Inc.); Asiatic Petroleum Co. (Royal Dutch-Shell); Texas Co. and a company controlled by the Soviets.

At present the Manchukuoan monopoly government is entirely dependent on these companies as sources of supply. It is understood, however, that before the end of the year the company expects to be able to secure practically all the products required from a new plant which is being built at Darein on the Bay of Korea. This plant is controlled by Japanese capital.

GERMANY

German consumption of motor fuels in 1934 was the highest on record, according to a report from Consul L. L. Schnare, Hamburg, made public by the Commerce Department. The total of 2,501,000 metric tons was 21 per cent higher than the consumption in the preceding year, the report shows.

The principal increase in motor fuel consumption occurred in the case of gasoline. The total of 1,300,000 tons of gasoline consumed was 20.5 per cent larger than in 1933. Gas oil consumption increased by 22 per cent to 710,000 tons; benzol by 20 per cent to 320,000 tons; and alcohol by 24 per cent to 171,000 tons, statistics show.

Domestic production of motor fuels made substantial progress during the past year. Of the total German consumption of 1,791,000 tons of light motor fuels in that period, 39 per cent was produced locally. Domestic production in 1934 was 28 per cent higher than in the preceding year. German production of benzol in 1934 amounted to 300,000 tons, an increase of 20 per cent over 1933, and ranking Germany second as a world producer of this item. Domestic production of gasoline increased by 44 per cent to 250,000 tons and of alcohol by 24 per cent to 171,000 tons. Gas oil production during the year remained unchanged at 110 tons, the consul reported.

All varieties of motor fuels were imported into Germany in substantially larger quantities in 1934 than in the preceding year, the report states. Gasoline imports advanced 15 per cent to a total of 1,050,000 tons; gas oil increased 26 per cent to 600,000 tons; while the relatively small imports of 40,000 tons of benzol were 19 per cent larger than in 1933.

Crater in new gas area in Transylvania, Rumania

MEXICO

The following values have been established for production and export taxes in Mexico: (calculated in silver at exchange of 3.6).

VALUES

Fuel oil:
27.17 silver pesos per c. m.=$1.20 per bbl.
Gasoline:
75.80 silver pesos per c. m.=$.0797 per gal.
Kerosene:
59.15 silver pesos per c. m.=$.0622 per gal.

PRODUCTION TAXES

	Tax Per cu. m. (pesos)	Tax In U.S. currency per bbl.
Crude:		
(Sp. gr. 0.93=Be. 20.38...	3.140	$0.13866
(Sp. gr. 0.96=Be. 15.68) or heavier	1.907	.08422
Fuel oil:		
(Sp. gr. 0.95=Be. 17.21)...	2.934	.12957
Gasoline:		Per gal.
Crude	3.032	.00319
Refined	1.516	.00159
Kerosene:		
Crude	3.549	.00373
Refined	1.775	.00187

The production tax on fuel oil will vary approximately .01062 per bbl. for each degree of specific gravity above (deduct) or below (add) 0.95 specific gravity.

The production tax on light crude will vary approximately .01137 per bbl. for each degree of specific gravity above (deduct) or below (add) 0.93 specific gravity.

Export Taxes

Note—As export taxes are payable in silver at par, to make calculations in United States currency, take figures given below, multiply them by 2 and divide by rate of exchange at time of payment.

	U. S. currency ($1 for 2 pesos)
Crude:	(Per bbl.)
(Sp. gr. 0.93=Be. 20.38).....	$0.07949
(Sp. gr. 0.96=Be. 15.68) or heavier	.04928
Fuel oil:	
(Sp. gr. 0.95=Be. 17.21).....	.05962
Gasoline:	(Per gal.)
Crude	.00472
Refined	.00189
Kerosene:	
Crude	.00151
Refined	.00057

Another tie-up in Mexican oil operations is threatened as a result of a contemplated general strike. The recent differences between oil workers and their employers has been settled and the latest action is aimed at the Employers Association which represents all the larger industries in Mexico. The oil workers who have threatened to walk out are employed in the Tampico area by the operation subsidiaries of the Royal Dutch-Shell and the Standard Oil Co. (New Jersey).

BELGIUM

"Redeventza" S.A. Blge pour le Raffinage de Petrole, 38 Rue Arenberg, Antwerp, Belgium, has completed the construction of a refinery which was started last year. The plant has facilities for topping 40,000 tons of crude oil yearly, or approximately 2,000 bbls. daily.

RUMANIA

Rumanian reports covering February operations show increased drilling, larger crude runs to stills and greater crude oil production. The crude oil production for the 28 days totaled 720,000 tons. This is a daily average of 180,000 bbls., a gain of approximately 10,000 bbls. daily over January. The principal producers in February were: Astra Romana, 132,543 tons; Concordia, 94,789 tons; Steau Romana, 87,321 tons; Phoenix, 81,640 tons, and Romano-Americana, 62,968 tons.

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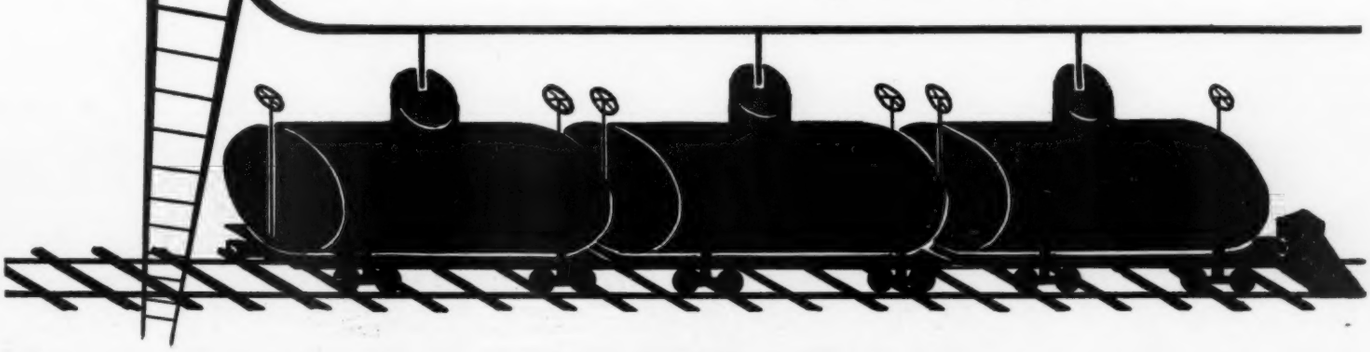

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Fresh Vigor and Advanced Prices Help to Create More Confidence in Group 3 Gasoline Market

By T. F. SMILEY

Fresh vigor in the Oklahoma (Group 3) gasoline market this week, with a further mark-up in tank car prices, strengthened the feeling that the spring rise is really on its way and that refiners and marketers have little reason for expecting more than minor interruptions until the peak of the consuming season is reached. Although some jobbers were still hesitant about buying, they were evincing more interest in the market, especially as it was becoming increasingly difficult to get immediate delivery. Other jobbers, persuaded that the buoyancy characterizing gasoline during the past month was not a mere upward fluctuation, have been filling their storage.

Several Factors Helping Market

Inter-refinery buying and continued reports of healthier conditions in East Texas contributed to the improving situation, with motoring weather and surcease of floods and dust storms stimulating consumption. Reports of rising sales of automobiles and trucks in various parts of the Group 3 marketing territory were among straws which indicated winds blowing in the right direction.

Available information revealed no surplus stocks overhanging the market anywhere in the Group 3 area, and it was said the April refinery allocations would make it necessary for some plants to draw on storage.

East Texas was declared to be in a more satisfactory position than it had been at any time in the past from the viewpoint of the refiner and marketer of legitimate oil products. Twenty-five plants were reported in operation in that area as the week opened. Twelve of these were running on lawful crude and were able to obtain federal tenders on their output. Of the others some were receiving state tenders and some were not receiving any, these latter having succeeded so far in defeating efforts designed to stop illegal oil operations. All the refineries which are not obtaining federal tenders are disposing of their products in trucks.

Violator's Path Becoming Hazardous

Evidence accumulates that the path of the law evader in East Texas is becoming increasingly hazardous; and if the state authorities enact legislation putting an end to the trucking of illicit gasoline, buyers who have been depending on this source of supply will be forced to turn to legitimate refiners, thus providing a still sounder foundation for the general market.

East Texas gasoline is going to northern points in relatively small lots. In some cases this is material which the buyer was unable to get elsewhere owing to sold-out conditions in the Oklahoma area. In others it was bought to meet the preferences of a clientele accustomed to handling the East Texas product and now asking for it.

East Texas refiners are reported to be making no effort to dispose of their gasoline on a Group 3 basis, with its freight penalty of about $13 a car, and most of it is moving to the Gulf and southeastern points.

Manifestation of the gasoline market's strength was seen in the lively demand for gas oils for cracking stock and the growing scarcity of this material. With a quick outlet for every gallon of legal gasoline manufactured, all the East Texas refiners who have cracking units have been putting these plants into operation. North Texas and Oklahoma refiners have been doing the same thing. The result is that cracking stock for northern shipment has become an extremely scarce article, with corresponding advances in quotations.

Natural Gasoline Men Satisfied

Natural gasoline manufacturers expressed themselves as satisfied with the market, all grades being reported steady, with quotations for stabilized material slightly higher than last week. The demand for stabilized grades probably had not increased, it was said in explanation of the higher quotations, but the manufacturers were disposed to hold their material unless they could get their price. The firmness characterizing almost the whole list was ascribed in large part to the strength of refinery gasoline.

Neutral Market Firm

The sharp decline into which Pennsylvania neutrals have run occasioned something like astonishment among Oklahoma refiners, who said nothing approaching such weakness had been encountered in their territory. On the contrary the market for all the lubricants was reported firm. Some refiners said they were having difficulty in keeping up with orders. The reason for the weakness in Pennsylvania neutrals was not apparent to Oklahoma refiners, although it was suggested the Pennsylvania material might have been carrying quotations a little higher than demand warranted in recent weeks.

Notwithstanding the advent of spring weather in many areas, quotations for furnace oils were unchanged. Their ability to hold was attributed to the cold wave which swept some regions during the week. No buying of consequence is expected, however, for another month or so, after which marketers in the North

(Continued on Page 64)

Refined Oil Market Barometer

Gasoline was firm to strong in all areas, with indications it would gather strength as the consuming season advances. Weakness in Pennsylvania neutrals seemed to be confined principally to that area. Wax, one of the weakest spots in the market, has now reached lows which it is believed may attract buying. General conditions affecting the markets in oil products, while still marked by uncertainties, are regarded for the most part as favorable.

Mid-Continent.—Gasoline strong. Naturals steady. Lubricants firm.

East Coast.—Motor fuels looking better. Kerosene and distillates weak. Diesel fuels and gas oils fair. Wax weak.

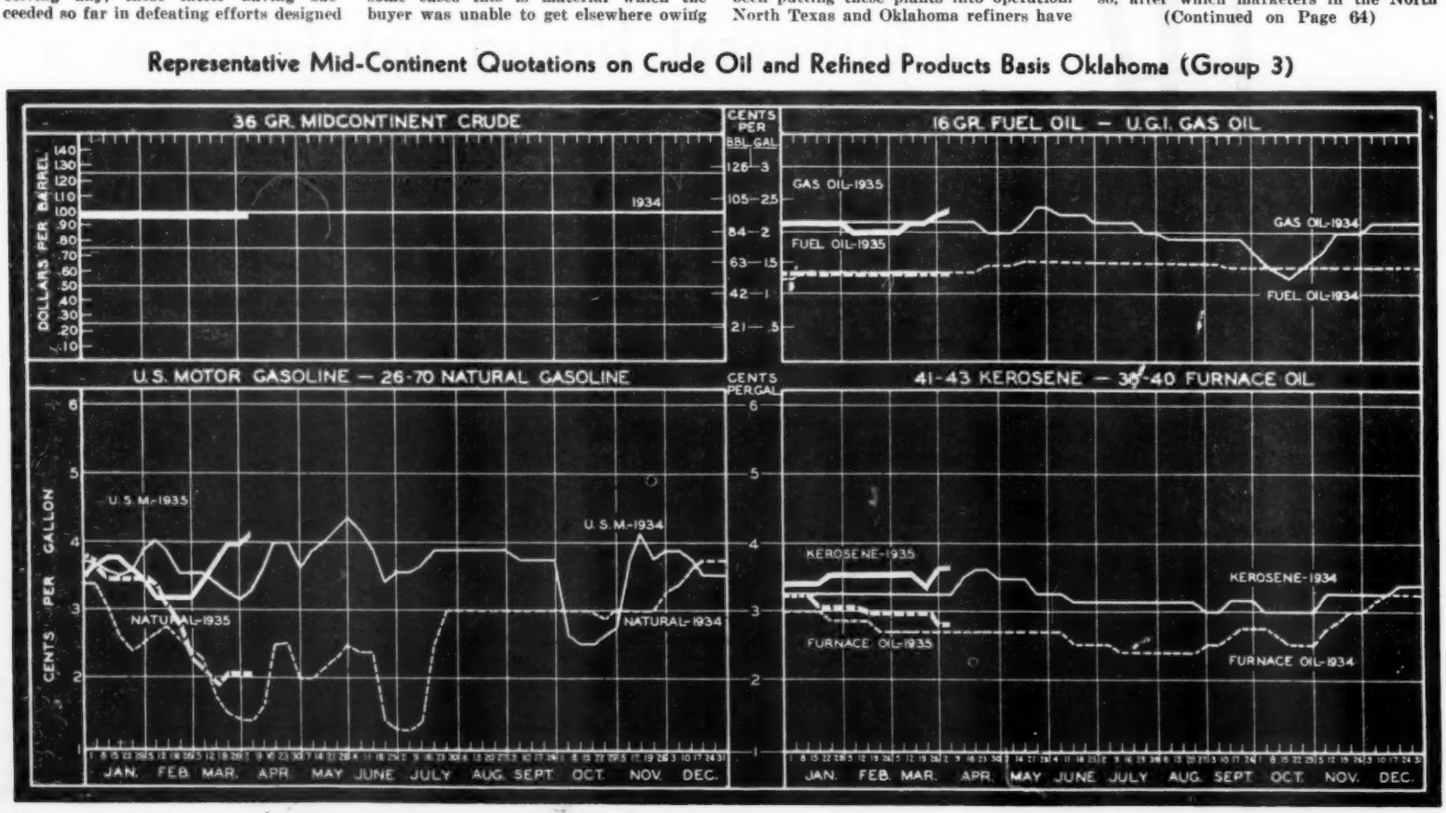
Gulf Coast.—Gasoline stronger. Kerosene weak. Gas oil and fuels steady. Lubricants slow.

Pennsylvania.—Neutrals lowest since 1933. Bright stock increase expected. Gasoline and kerosene good.

California.—Diesel and gas oil strong. Gasoline firm. Natural weak.

Chicago.—Gasoline strong. Kerosene firm. Industrial oils slightly more active.

Representative Mid-Continent Quotations on Crude Oil and Refined Products Basis Oklahoma (Group 3)



Improvement Is Noticeable in Atlantic Seaboard Refined Markets With Better Prices Forecast

By C. O. WILLSON
New York Bureau, The Oil and Gas Journal

NEW YORK, Apr. 1.—A new month opened today in eastern refinery markets with a better feeling than prevailed a month ago in regard to the probable trend in quotations on motor fuels. There have been indications of improvement over the past week and today there were those who were willing to predict generally higher prices in the near future, a few hazarding the guess that the upturn would start this week.

Among the other products, kerosene and distillates continued on the weak side of the market although the larger sellers did not make any further reductions in their quotations. It was conceded that some of the smaller sellers were shading the quotations of the larger refiners from one-eighth to one-fourth cent per gallon. Diesel fuels, gas oils and residual fuels were holding their own with a fair demand and steady prices. Refined wax prices were again reduced one-half cent per pound making a total reduction of 1 cent over the past month. It is hoped that this latest reduction will be sufficient to start export and domestic buying which has been below normal for several months. The price changes for the week in lubricants were of minor importance. No division of this market is considered strong but it hoped that with an improved seasonal demand for motor oils that the movement from refineries will improve and the market stiffen.

Gasoline at Gulf

There were definite indications of improvement at the Gulf in the gasoline market. The latter part of last week a coastwise tanker of plug 65 octane U. S. Motor gasoline was reported to have been placed at the Gulf at 5¼ cents. The tanker was for 75,000 bbls. and called for April delivery. This reported price is at least three-fourths cent per gallon above recent lows in the Gulf market. This same grade is generally quoted in the New York Harbor market at 5¾ cents in tank car lots and one-fourth cent lower for barge delivery.

This Gulf Coast price would support a 6¼-cent market for the 65 octane material in the New York area and it is this fact that has led to the prediction that tank car quotations on all grades will be advanced one-half cent in the near future. At present the low octane motor is quoted at 5¼ cents, middle octane 5½ cents, and ethylized regular 6 cents. Should tank car prices be advanced it is also assumed that service station prices on gasoline will be advanced 1 or 2 cents per gallon. Indicative of market conditions in this territory, regular grade gasoline is selling to retail buyers in New York City for 14 and 14.5 cents, Rochester and Syracuse 15 cents, and Buffalo 12.5 cents. These prices include 4 cents state and federal taxes. An additional 1-cent state tax becomes effective today. The New York City price is 3.5 cents below what is considered the normal level and in the case of Buffalo, 5.5 cents. The New England situation is slightly better but there are enormous points there which are 1 to 2 cents under break-even or profitable levels. It is said that the major factors in the retail markets have been postponing advances in these retail markets until a better tank car market is established.

Discussing the Code

Whenever retail prices are mentioned the discussion often shifts as to what will happen in June when the present petroleum code expires along with other codes that became effective under the NRA. Within the marketing end of the industry opinions vary from those who feel that the code under government supervision should be continued and strengthened to those who are hopeful that the NRA will not be continued and all codes dropped. The code supporters in some cases are predicting a collapse in markets with generally demoralized conditions applying to tank car, dealer and service station prices. They want additional authority given the government administration with more stringent regulations and authority to punish violators. There are a few at least who favor some form of price fixing in connection with the code.

Those who favor the continuance of the code in substantially its present or more stringent form are probably in a minority in this territory. So far as the fear of a price collapse is concerned should the code not be continued, it is pointed out that conditions could not be much worse than they have been over the greater part of the past year. The code is given little credit by these observers as a market stabilizer based on the records in this territory over the past year. In fact it is felt by some that there would have been fewer price difficulties and their duration would have been much shorter if everyone concerned had been in a position to take whatever means were considered expedient to end price-war conditions. While one of the objections heard to the NRA program has been that it favored the large companies as against the small operators there is little proof of that contention in the retail end of the oil business. Labor regulations and other provisions have not been to the interest of the larger operators and have often tied their hands in their efforts to straighten out conditions brought about by individual station operators who had few restrictions under the code.

Claim Code Not Beneficial

These discussions are mentioned here because of their relationship to the gasoline market and indirectly to other markets over the next 60 days. Some have contended that the weakness in the gasoline market which first became apparent in February was due to the fear as to what would happen should all code restrictions be lifted. There appears to be little basis for this contention. The principal control point in oil operations is at the wells and the state and federal regulations concerning proration will continue regardless of what happens to the NRA or the general code revisions. The evidence is not convincing that code operations in the refining and marketing divisions ever contributed materially to the maintenance of profitable prices and it is certain that the NRA did add to the operating costs. What good was accomplished could probably be done under a voluntary plan of co-operation.

Starting today a new schedule of refinery crude runs to stills becomes effective for the entire country. The allocations by areas seek to bring about a reduction in gasoline stocks during the month although April normally is a period in which small additions are made to storage. It is hoped to correct the situation brought about by too heavy refinery operations the first three months of the year. Those in touch with this situation would like to see stocks of finished motor fuels at refineries and bulk terminals under 55,000,000 bbls. by May 1 for the entire country and under 17,000,000 bbls. for the East Coast area. Crude runs to stills have been substantially above 1934 although the demand for gasoline has been practically the same as last year with no noteworthy gains in other products.

Prices

Export quotations at the Gulf on gasoline are slightly higher. This reflects the improved coastwise market rather than any increase in foreign buying. One cargo of 375 endpoint gasoline was reported to have been placed last week at a 4⅞-cent price. Most sellers are now quoting 5 cents for that grade at the Gulf with price ranging up from 4½ cents for the other grades. So far as foreign markets are concerned there are more inquiries for crude oil than any of the refinery products. Some spot crude business has been placed over the past two weeks but buyers generally have not been able to interest sellers in sales over the balance of the year even when some protection is given in a sliding scale based on gasoline quotations. This is the most conclusive evidence available that the East Texas control situation is in better shape than it was a year ago or a few months ago.

Kerosene is quoted at the Gulf at 4 cents for coastwise and export movement. The market here is 5¼ cents in tank car lots and 5 cents in barges. Both prices are being shaded in scattered sales. The No. 1 range oil is also 5¼ cents and the other grades 4¼ cents. All grades are freely offered at these prices.

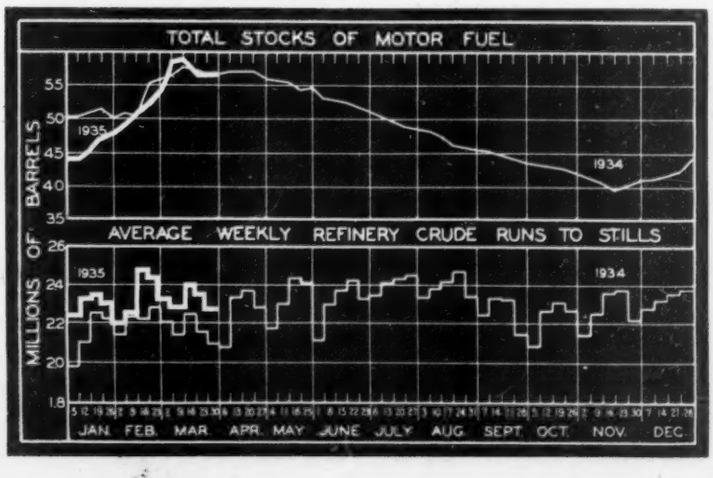
The heavy fuels are unchanged at $1.15 per barrel for bunker and 4 cents per gallon in tank car lots for industrial fuel. Gas oil and Diesel fuel in tank car lots is 4¼ cents and Diesel fuel is $1.89 per barrel to the marine trade. Due to disparity between the marine and tank car price it is thought that the marine price may be reduced.

Representative prices for refined wax now are 4 cents for 128-130 and 3¾ cents for 123-125. The white crude scale (124-126) is quoted 2 to 2.25 with sales of the yellow under 2 cents.

American Petroleum Institute Weekly Refinery Statistics

Week Ending March 30, 1935

	Capacity reporting per cent	Daily crude runs (bbls.)	Finished motor fuel (bbls.)	Gas oil and fuel oil (bbls.)
East Coast	100.0	421,000	17,337,000	9,785,000
Appalachian	93.3	99,000	2,147,000	860,000
Indiana, Illinois, Kentucky	94.6	315,000	9,568,000	4,416,000
Oklahoma, Kansas, Missouri	83.7	240,000	5,695,000	3,925,000
Inland Texas	47.6	89,000	1,400,000	1,897,000
Texas Gulf	97.7	498,000	6,770,000	8,424,000
Louisiana Gulf	96.4	121,000	1,601,000	3,491,000
North Louisiana and Arkansas	83.7	41,000	248,000	345,000
Rocky Mountain	66.7	41,000	988,000	761,000
California	96.9	429,000	10,625,000	65,201,000
Total United States	89.8	2,294,000	56,388,000	99,105,000



REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement except as otherwise noted

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasolines

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
U. S. Motor grades:				
Below 63 octane	.04⅛	.04¼	.04	.04⅛
63-70 octane	.04⅞	.05⅛	.04¾	.05
60-62 400 grade:				
Below 63 octane	.04⅛	.04¼	.04	.04⅛
63-70 octane	.04⅞	.05⅛	.04¾	.05
64-66 375	.04¾	.04½	.04⅛	.04¼
68-70 360	.04½	.04⅝	.04¼	.04⅜
NORTH TEXAS—				
U. S. Motor grades:				
Below 63 octane	.04¼	.04¾	.04⅛	.04⅜
63-70 octane	.04⅞	.05⅛	.04⅞	.05⅛
60-62 400	.04⅜		.04¼	.04⅜
64-66 375	.04⅜	.04½	.04⅜	.04½
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
U. S. Motor grades:				
Below 63 octane	.04¾		.04¾	
63-70 octane	.05½		.05½	
60-62 400	.04¾		.04¾	
ARKANSAS (Ark., N. La. & Miss. del.)—				
U. S. Motor grades:				
Below 63 octane	.04¾		.04¾	
63-70 octane	.05½		.05½	
CHICAGO (based on Oklahoma Group 3)—				
U. S. Motor grades:				
Below 63 octane	.04⅛	.04⅜	.04	.04⅛
63-70 octane	.04⅞	.05⅛	.04¾	.05
60-62 400	.04⅛	.04⅜	.04⅛	.04¼
64-66 375	.04¼	.04½	.04¼	.04⅜
68-70 360	.04⅜	.04½	.04⅜	.04½
Aviation fighting grade	.05	.05⅛	.05	.05⅛
PENNSYLVANIA (inland refineries)—				
58-60 U. S. Motor:				
Below 60 octane	.05		.05	
60-64.9	.05¾		.05¾	
65-70 octane	.06		.06	
68-70 350	.05⅝		.05⅝	
CALIFORNIA (domestic movement)—				
54-58 U. S. Motor	.07	.08	.07	.08
58-60 400	.08	.09	.08	.09
EAST COAST—				
U. S. Motor, below 60 octane:				
*New York	.05¼		.05¼	
Baltimore	.05½		.05½	
U. S. Motor, 60-64.9 octane:				
*New York (Bayonne)	.05½		.05½	
Philadelphia	.05¾	.06	.05¾	.06
Boston	.05½	.05¾	.05½	.05¾
Baltimore	.05½	.05¾	.05½	.05¾
Charleston, S. C.	.05½	.05¾	.05½	.05¾
U. S. Motor, 65 and above:				
*New York	.05¾		.05¾	
Philadelphia	.06	.06¼	.06	.06¼
Boston	.05¾	.06	.05¾	.06
Baltimore	.05¾	.06	.05¾	.06
Charleston, S. C.	.05¾	.06	.05¾	.06

*All grades of gasoline one-fourth cent less for small barge shipments.

GULF COAST (domestic)—				
U. S. Motor:				
Below 60 octane	.05⅛	.05¼	.05	.05⅛
60-64.9 octane	.05¼	.05⅜	.05¼	
65 octane and higher	.05⅜	.05½	.05¼	.05½

Naphthas

PENNSYLVANIA (inland refineries)—	Apr. 2		Mar. 26	
50-52 (blending)	.04¾		.04¼	.04½
52-54 450 (blending)	.04¾		.04¼	.04½
54-56 450 (blending)	.04⅞		.04¼	.04½
50-52 450 (blending)	.04¾		.04¼	.04½
CHICAGO (based on Oklahoma Group 3)—				
50-52 450 (blending)	.04⅛	.04⅜	.04	.04⅛
Cleaners' naphtha, 56-58 gr., 200 i.b.p., 320 e.p.	.06¾	.07	.06¾	.07
Lacquer diluent, 180 i.b.p., 250 e.p.	.07¾	.08	.07¾	.08
Lacquer diluent, 140 i.b.p., 200 e.p.	.08¾	.09	.08¾	.09
Rubber solvent, 68-70 gr., 100 i.b.p., 300 e.p.	.06¾	.07	.06¾	.07
Stoddard solvent, 300 i.b.p., 410 e.p., over 83° flash	.06¼	.06½	.06¼	.06½
Pet. thinner, 290-300 i.b.p., 410 e.p., over 83° flash	.06¼	.06½	.06¼	.06½
V.M.&P. naptha, 56-58 gr., 190-200 i.b.p., 330 e.p.	.06¾	.07	.06¾	.07
Petroleum spirits	.05¾	.06	.05¾	.06

Natural Gasolines

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
Grade 26-70	.02⅛	.02¼	.02⅛	.02¼
Grade 18-55	.02⅞	.03	.02¾	.02⅞
Low vapor pressure grades:				
14 lb. v.p. (max.)	.03⅛	.03⅜	.03⅛	.03¼
12 lb. v.p. (max.)	.03¾	.04	.03¾	.04
NORTH TEXAS—				
Grade 26-70	.02	.02⅛	.02	.02⅛
Grade 18-55	.02¾	.03	.02⅝	.02¾
Low vapor pressure grades:				
14 lb. v.p. (max.)	.03	.03¼	.03	.03¼
12 lb. v.p. (max.)	.03⅝	.03¾	.03⅝	.03¾
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
Grade 26-70	.02⅜		.02⅜	
CALIFORNIA—				
75-85 375	.05	.06	.05	.06

Kerosenes

(All kerosenes water white)

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
41-43	.03½	.03⅝	.03½	.03⅝
42-44	.03⅝	.03¾	.03⅝	.03¾
NORTH TEXAS—				
40-41	.03⅜	.03½	.03⅜	.03½
41-43	.03⅝	.03¾	.03⅝	.03¾
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
41-43	.03¾		.03¾	
ARKANSAS (Ark., N. La. & Miss. del.)—				
41-43	.03⅞		.03⅞	
PENNSYLVANIA (inland refineries)—				
45	.04⅞	.05	.04⅞	.05
46	.05	.05⅛	.05	.05⅛
47	.05⅛	.05¼	.05⅛	.05¼
CHICAGO (based on Oklahoma Group 3)—				
41-43	.03½	.03⅝	.03⅜	.03⅝
42-44	.03⅝	.03¾	.03⅝	.03¾
CALIFORNIA (Pacific Coast consumption)—				
38-40 high burning test	.04½	.05	.04½	.05
NEW YORK (Bayonne, N. J.)—				
41-43	.05¼		.05¼	
GULF COAST (domestic)—				
41-43	.04	.04¼	.04½	.04¾

Petroleum Coke

(Prices per ton f.o.b. refineries in Chicago area)
(Refineries will absorb freight to 80 cents a ton)

	Apr. 2	Mar. 26
Pile run	6.00	6.00
Direct from still	7.00	7.00
Egg, nut, pea	8.50	8.50
Lump	8.50	8.50

Furnace Oils and Tractor Fuels

(Zero cold test under 190° flash and good odor)

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
32-36 straw	.02¾	.02⅞	.02¾	.02⅞
36-38 straw	.02⅞	.03	.02⅞	.03
38-40 straw	.02⅞	.03	.02⅞	.03
38-40 prime white	.03	.03⅛	.03	.03⅛
NORTH TEXAS—				
38-40 straw	.03	.03⅛	.03	.03⅛
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
36-40 furnace oil	.02¾	.02⅞	.02¾	.02⅞
ARKANSAS (Ark., N. La. & Miss. del.)—				
32-36 furnace oil	.02¾	.02⅞	.02¾	.02⅞
CHICAGO (based on Oklahoma Group 3)—				
32-36 straw	.02⅞	.03	.02⅞	.03
38-40 straw	.03	.03⅛	.03	.03⅛
38-40 prime white	.03⅛	.03¼	.03⅛	.03¼
NEW YORK (Bayonne, N. J.)—				
No. 1	.05¼		.05¼	
No. 2	.04¼		.04¼	
No. 4	.04¼		.04¼	

Gas Oil, Diesel Oil and Fuel Oil

(Gas oil per gal., Diesel and fuel oils per bbl.)

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
32-36 gas oil, cracking stock	.02¼	.02½	.02¼	.02¾
U.G.I. gas oil	.02⅜	.02½	.02¼	.02⅜
32-36, zero to 15 gas oil	.02¾	.02⅞	.02⅜	.02⅞
28-30, No. 3 burner oil	1.05	1.10	1.05	1.10
26-30, zero to 10 fuel oil	.95	1.00	.95	1.00
24-26 fuel oil	.75	.77½	.75	.77½
20-22 fuel oil	.70	.75	.70	.75
Below 16 fuel oil	.60	.62½	.60	.62½
NORTH TEXAS—				
32-36 gas oil, industrial	.02⅜	.02½	.02¼	.02⅜
22-26 fuel oil	.65	.67½	.65	.67½
Below 20 fuel oil	.60	.62½	.60	.62½
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
30-32 gas oil, zero	.02⅞	.03	.03	.03⅛
14-16 fuel oil	.70	.75	.70	.75
ARKANSAS (Ark., N. La. & Miss. del.)—				
30-32 gas oil, zero	.02⅞	.03	.03	.03⅛
32-36 gas oil	.02¾	.02⅞	.02¾	.02⅞
14-16 fuel oil	.65	.70	.65	.70
CHICAGO (based on Oklahoma Group 3)—				
32-36 gas oil, industrial	.02⅜	.02½	.02	.02⅛
28-30 zero to 10, fuel oil	1.05	1.10	1.05	1.10
26-28 zero to 10 fuel oil	.95	1.00	.95	1.00
22-26 zero to 10, fuel oil	.82½	.87½	.82½	.87½
18-22 zero to 10, fuel oil	.67½	.70	.67½	.72½
Below 18 fuel oil	.57½	.62½	.57½	.62½

Note: Fuel oils of more than 40 cold test generally 5 to 15 cents per barrel in all these areas.

PENNSYLVANIA (inland refineries)—				
30-40	.04⅛		.04⅛	
CALIFORNIA—				
Los Angeles:				
30-34 gas oil, per bbl.	1.15	1.26	1.10	1.26
27 plus Diesel	1.15	1.25	1.10	1.15
27 plus Diesel (bunkers)	1.20	1.30	1.13	1.20
12-16 (bunkers at tidewater)	.82½	.85	.82½	.85
10-16 (cargo lots)	.70	.75	.70	.75
12-17 (tank cars)	.62½	.80	.62½	.80
San Joaquin Valley:				
10-18 (tank cars)	.60	.70	.60	.70
San Francisco:				
27 plus Diesel, per bbl.	1.15	1.20	1.15	1.20
27 plus Diesel (bunkers)	1.20	1.25	1.19	
10-16 (bunkers)	.90		.90	
GULF COAST—				
28-30 gas oil	.03½	.03⅝	.03½	.03⅝
28-30 Diesel (bunkers)	1.70		1.70	
Bunker C (bulk cargoes)	.85	.90	.85	.90
Bunker C (bunkers)	.95	1.00	.95	1.00
NEW YORK (Bayonne, N. J.)—				
27 plus, gas oil	.04¼		.04¼	
28-30 Diesel (lighterage 6½ cents per bbl.)	1.89		1.89	
28-30 Diesel (tank cars)	.04¼		.04¼	
*Bunker C (to ocean-going ships in N. Y. harbor)	1.15		1.15	
Industrial fuel (tank cars)	.04		.04	

*Lighterage charge 5 cents per barrel additional.

Neutral Oils

(Vis. at 100° F. except Pennsylvania, and color N.P.A.)

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
Zero to 10 Cold Test:				
150-3	.10		.10	
180-3	.11¼		.11¼	
180-4	.10¾		.10¾	
200-3	.11¾		.11¾	
200-4	.11¼		.11¼	
240-3	.13¾		.13¾	
240-4	.13¼		.13¼	
280-3	.14¾		.14¾	
280-4	.14		.14	
300-3½	.15¼		.15¼	
400-4	.17¼		.17¼	
100-2 paraffin oil	.05¾		.05¾	
15-20 Cold Test:				
200-3	.10¾		.10¾	
200-4	.10¼		.10¼	
240-3	.12¾		.12¾	
240-4	.12¼		.12¼	
280-3	.13¾		.13¾	
280-4	.13		.13	
GULF COAST—				
Pale Oils:				
200-3	.07	.07½	.07	.07½
300-3	.07½	.08	.07½	.08
500-3½	.08½	.09	.08½	.09
750-3½	.09	.09¼	.09	.09¼
1,200-3½	.09½	.09¾	.09½	.09¾
2,000-4	.09¾	.10	.09¾	.10
Red Oils:				
200-5-6	.07	.07¼	.07	.07¼
300-5-6	.07¼	.07½	.07¼	.07½
500-5-6	.08	.08½	.08	.08½
750	.08½	.09	.08½	.09
1,200-5-6	.09¼	.09½	.09¼	.09½
CALIFORNIA (moving to domestic market)—				
Pale Oils:				
100-2½-3	.08	.08½	.08	.08½
200-2½-3	.12½	.13½	.12½	.13½
300-3-3½	.12½	.13½	.12½	.13½
350-3-4	.12½	.13½	.12½	.13½
400-3-4	.12½	.13½	.12½	.13½
450-3-4	.12½	.13½	.12½	.13½
550-3-4	.12½	.13½	.12½	.13½
600-3-4	.12½	.13½	.12½	.13½
Red Oils:				
200-4-5	.12½	.13½	.12½	.13½
300-5-6	.12½	.13½	.12½	.13½
350-5-6	.12½	.13½	.12½	.13½
400-5-6	.12½	.13½	.12½	.13½
450-5-6	.12½	.13½	.12½	.13½
500-5-6	.12½	.13½	.12½	.13½
600-5-6½	.12½	.13½	.12½	.13½
700-6½ plus	.12½	.13½	.12½	.13½
750-6½ plus	.12½	.13½	.12½	.13½
900-6½ plus	.12½	.13½	.12½	.13½
PENNSYLVANIA—				
150 vis. at 70° F., 3 color, 400-405 flash:				
Zero pour test	.20½	.21	.23½	.24
10 pour test	.19½	.20	.22½	.23

15 pour test	.19	.19½	.22	.22½
25 pour test	.18	.18½	.21	.21½
180 vis. at 70° F., 3 color:				
25 pour test	.21	.21½	.23½	.24
200 vis. at 70° F., 3 color:				
Zero pour test	.25½	.26	.28½	.29
10 pour test	.24½	.25	.27½	.28
15 pour test	.24	.24½	.26	.26½
25 pour test	.23	.23½	.26	.26½

Bright and Steam Refined Stocks

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
Bright stocks:				
190-200 D	.17		.17	
150-160 D, 0-10	.14		.14	
150-160 D, 10-25	.13½		.13½	
150-160 24-40	.13		.13	
150-160 E	.13		.13	
Steam refined:				
630 light green (treated)	.07½	.08	.07½	.08
600 light green (untreated)	.06	.08	.06	.08
600 dark green (untreated)	.04½	.07	.04½	.07
PENNSYLVANIA—				
Bright Stocks (Pennsylvania grade, No. 8 color, 145-50 at 210; 540-550 flash):				
10 pour test	.18½	.19	.18½	.19
15 pour test	.17½	.18	.17½	.18
20 pour test	.16½	.17	.16½	.17
25 pour test	.15½	.16	.15½	.16
Steam refined:				
600	.07½	.08	.07½	.08
650	.10	.10½	.10	.10½
600 Pennsylvania flash	.11½	.12	.11½	.12
630 flash	.16	.16½	.16	.16½
600 Warren E filtered	.12	.12½	.12	.12½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—	Apr. 2		Mar. 26	
124-126 white crude scale	.02	.02¼	.02	.02¼
PENNSYLVANIA (inland refineries)—				
122-124	.0210	.0215	.0210	.0215
124-126	.0215	.0220	.0215	.0220
NEW YORK—				
Wax (a.m.p.) in bags fully refined:				
Refined grades:				
123-125	.0380		.0430	
125-127	.0400		.0450	
128-130	.0425		.0475	
130-132	.0440		.0490	
133-135	.0500		.0550	
135-137	.0525		.0575	
Crude scale:				
124-126 w.s.	.0200	.0225	.0200	.0225
124-126 y.s.	.0190	.0210	.0190	.0210
Petrolatum in barrels in carload lots:				
Dark green	.01⅞		.01⅞	
Amber	.02⅞	.03	.02⅞	.03
Extra amber	.03	.03⅛	.03	.03⅛
Lily white	.06⅝	.06¾	.06⅝	.06¾
Snow white	.07¾	.07⅞	.07¾	.07⅞
Cream	.05⅝	.05¾	.05⅝	.05¾
CHICAGO (based on Oklahoma Group 3)—				
122-124 wax	.0440	.0450	.0440	.0450
125-127 wax	.0465	.0475	.0465	.0475
127-129 wax	.0480	.0490	.0480	.0490
130-132 wax	.0540	.0550	.0540	.0550
132-134 wax	.0565	.0575	.0565	.0575

*Cents per pound on carload orders in burlap bags of 225 lbs. approx. Add 3° F. a.m.p.

Export Prices

GASOLINE

GULF COAST—	Apr. 2		Mar. 26	
*U. S. Motor	.04½	.04⅝	.04¼	.04⅜
60-62 400	.04⅝	.04¾	.04⅜	.04½
61-63 390	.04¾		.04½	.04⅝
64-66 375	.04⅞	.05	.04¾	.04⅞

*Prices carried in the February 21 and 28 issues for U. S. Motor gasoline were incorrect as of February 19 and 26. The prices should have been .0425 to .04375 for both dates. The prices carried in those issues were .0425 to .0475.

LOS ANGELES:				
U. S. Motor grades:				
53-55 octane	.04	.04¼	.04	.04¼
55-65 octane	.04¼		.04¼	
65-67 octane	.04¼	.04½	.04¼	.04½
67-69 octane	.04½	.04¾	.04½	.04¾
Above 69 octane	.04¾	.05¼	.04¾	.05¼
58-60 400 endpoint	.04½	.05	.04½	.05
KEROSENE				
GULF COAST—				
41-43 prime white	.03⅞	.04	.03⅞	.04
41-43 water white	.04	.04¼	.04	.04¼
44 water white	.04¼		.04¼	
LOS ANGELES:				
41-43 water white	.04¼	.04¾	.04¼	.04¾
LUBRICANTS				
NEW YORK (f.a.s. in bbls.)—				
Cylinder Stocks:				
600 Warren E	.18½	.19	.18½	.19
600 S.R. unfiltered	.14	.14½	.14	.14½
650 S.R. unfiltered	.15½	.16	.15½	16
600 flash S.R.	.16½	.17	.16½	.17
630 flash S.R.	.20½	.21	.20½	.21
Bright Stocks:				
8 color	.21½	.22	.21½	.22
6½ plus colors in dilution	.20½	.21	.20½	.21
NEUTRAL OILS				
200-3 color	.30	.32	.30	.32
150-3 color	.25	.27	.25	.27

PARAFFIN WAX (Fully Refined)

NEW YORK (prices per pound):				
123-135 a.m.p.	.03625		.04125	
125-127 a.m.p.	.0375		.0425	
128-130 a.m.p.	.0400		.0450	
130-132 a.m.p.	.0475		.0525	
133-135 a.m.p.	.0475		.0525	
135-137 a.m.p.	.0525		.0575	
Crude scale:				
124-126 w.s.	.0200	.0215	.0200	.0215
124-126 y.s.	.0185	.0200	.0185	.0200

Crude Oil Gravity Table

Gravity—	Oklahoma and Kansas	North Texas, Central Texas and East Central Texas	North Louisiana and Arkansas	Gray County, Texas	Carson, Hutchinson and Moore Counties, Texas	Conroe, Texas	Salt Creek, Wyo	Gulf Coast, Texas and Louisiana	Gulf Coast, Texas and Louisiana	Cotton Valley, Louisiana
	1	2	3	4	5	6	7	8	9	10
Below 20	....	....	....	....	....	....	....	$.82	$.82	....
20-20.9	....	....	....	....	....	....	....	.84	.84	....
21-21.9	....	....	....	....	....	....	....	.86	.86	....
22-22.9	....	....	....	....	....	....	....	.88	.88	....
23-23.9	....	....	....	....	....	....	....	.90	.90	....
24-24.9	....	....	....	....	....	....	....	.92	.92	....
Below 25	*$.76	....	....	....	....	....	....	....	....	$.70
25-25.9	*.78	....	....	....	....	....	....	.94	.94	.72
26-26.9	*.80	....	....	....	....	....	....	.96	.96	.74
27-27.9	*.82	....	....	....	....	....	....	.98	.98	.76
28-28.9	*.84	....	....	....	....	....	....	1.00	1.00	78
Below 29	.84	$.79	$.79	....	....	....	$.84	....	....	....
29-29.9	.86	.81	.81	....	....	....	.86	1.02	1.02	.80
30-30.9	.88	.83	.83	....	....	....	.88	1.04	1.04	.82
31-31.9	.90	.85	.85	....	....	....	.90	1.06	1.06	84
32-32.9	.92	.87	.87	....	....	....	.92	1.08	1.06	.86
33-33.9	.94	.89	.89	....	....	....	.94	1.10	1.07	.88
34-34.9	.96	.91	.91	....	....	....	.96	1.12	1.08	.90
Below 35	....	....	....	$.79	$.69	....	....	....	....	....
35-35.9	.98	.93	.93	.81	.71	$1.09	.98	1.12	1.09	.92
36-36.9	1.00	.95	.95	.83	.73	1.11	1.00	1.12	1.10	.94
37-37.9	1.02	.97	.97	.85	.75	1.13	1.02	1.12	1.11	.96
38-38.9	1.04	.99	.99	.87	.77	1.15	1.04	1.12	1.12	.98
39-39.9	1.06	1.01	1.01	.89	.79	1.17	1.06	1.12	1.13	1.00
40 and over	1.08	1.03	1.03	.91	.81	1.19	1.08	1.12	1.14	1.02

Effective December 3, 1934, Panhandle Refining Co., purchasing oil in North Texas, posted below 29 degrees, 68 cents; 29-29.9 degrees, 70 cents, with 2 cents added for each additional degree up to 40 and over, at 92 cents.

*The following companies purchasing crude oil in Kansas or Oklahoma, or both, begin their price schedule: Below 25°, 76 cents; 25-25.9°, 78 cents, with 2 cents added for each degree upward to 40 and over at $1.08; Carter Oil Co., Magnolia Petroleum Co., Pure Oil Co., Rock Island Refining Co., Shell Petroleum Corp., Sinclair Prairie OilMarketing Co., Skelly Oil Co., and Wilcox Oil & Gas Co. All others begin their schedules at below 29°, 84 cents, excepting Phiitex Oil Co., which begins with below 31° at 88 cents.

Column 1—Effective September 29, 1933, Texas Co. of Oklahoma; Stanolind Crude Oil Purchasing Co. in Kansas and Oklahoma; Anderson & Prichard, Inc., in Oklahoma; Bell Oil & Gas Co. in Oklahoma; Carter Oil Co. in Oklahoma and Kansas; Deep Rock Oil Co. in Oklahoma; Derby Oil Co. in Kansas; Globe Refining Co. in Oklahoma; Golden Rule Refining Co. in Kansas; Gypsy Oil Co. in Oklahoma and Kansas; Kanotex Refining Co. in Kansas; Magnolia Petroleum Co. in Oklahoma; Mid-Continent Petroleum Corp. in Oklahoma; National Refining Co. in Kansas and Oklahoma; Shell Petroleum Corp. in Kansas and Oklahoma; Sinclair Prairie Oil Marketing Co. in Kansas and Oklahoma; Texas Co. in Oklahoma; Tide Water Oil Co. in Oklahoma; Vickers Refining Co. in Kansas; Continental Oil Co. in Kansas and Oklahoma; Empire Pipe Line Co. in Oklahoma and Kansas; Phiitex Oil Co. in Kansas and Oklahoma; Pure Oil Co. in Oklahoma; Skelly Oil Co. in Kansas. Effective September 29, by White Eagle Oil Corp. in Kansas; October 1, by Barnsdall Refineries, Inc., in Oklahoma.

Column 2—Effective September 29, 1933, by Texas Co., Stanolind Crude Oil Purchasing Co., Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Gulf Pipe Line Co., Magnolia Petroleum Co., Bell Oil & Gas Co., Continental Oil Co. Effective January 14, 1935, in the Van Pool, Van Zandt County, Pure Oil Co. posted below 29°, 79 cents, with 2 cents added for each degree up to 40 and over at $1.03.

Column 3—Effective September 29, 1933, by Texas Co., Magnolia Petroleum Co., Gulf Refining Co. Effective December 22, Stanolind Oil & Gas Co. in Pine Island, Louisiana, and Marion County, Texas, posted below 29°, 79 cents, with 2 cents added for each degree up to 40 and over at $1.03. Effective March 17, 1934, by Standard Oil Co. of Louisiana and Louisiana Oil Refining Co. Starting with below 25°, 71 cents, adding 2 cents for each degree upward to 40 and over at $1.03.

Column 4—Effective September 29, 1933, by Texas Co., Humble Oil & Refining Co., Magnolia Petroleum Co., Sinclair Prairie Oil Marketing Co., and H. F. Wilcox Oil & Gas Co. On same day, Phiitex Oil Co. posted below 31°, 71 cents, with 2 cents added for each degree up to 40 and over at 91 cents. Effective June 1, 1934, Texas Co. (see note above).

Column 5—Effective September 29, 1933, by Texas Co., Humble Oil & Refining Co., Gulf Pipe Line Co., Magnolia Petroleum Co., Wilcox Oil & Gas Co., Continental Oil Co. On same day, Phiitex Oil Co. posted below 31°, 61 cents, with 2 cents added for each degree upward to 40 and over at 81 cents. Effective June 1, 1934, Texas Co. (see note above).

Column 6—Effective September 29, 1933, by Humble Oil & Refining Co. and Tide Water Oil Co., and on September 30 by Texas Co., which on September 29 had posted a schedule of $1.07 to $1.12 with a 1-cent spread on each degree.

Column 7—Effective September 29, 1933, by Stanolind Oil & Gas Co.

Column 8—Effective September 29, 1933, by Humble Oil & Refining Co., Gulf Pipe Line Co., Shell Petroleum Corp., Pure Oil Co., Sinclair Prairie Oil Marketing Co. On October 2, Magnolia Petroleum Co. posted Lockport, Louisiana, 20-20.9°, 84 cents, with 2 cents added for each degree upward to 34 and over at $1.12; and in Cameron Meadows and Iowa, Louisiana, below 20°, 72 cents, with 2 cents added for each degree up to 34 and over at $1.02. These prices were 2 cents higher on each degree than Magnolia prices posted on September 29. Effective September 29, Shell Petroleum Corp. posted in Iowa, Louisiana, district: Below 20°, 70 cents, with 2 cents added for each degree upward to 34° and over at $1; and in Black Bayou and White Castle, Louisiana: Below 20°, 80 cents, with 2 cents added for each degree upward to 34° and over at $1.10.

Column 9—Effective September 30, 1933, Texas Co. (On September 29 Texas Co. has posted a schedule of 2 cents on each degree, but changed it on September 30.)

Column 10—Effective September 29, 1933, by Louisiana Oil Refining Co.

(California Crude Oil Prices on Page 151)

Crude Oil Prices

Oklahoma, Kansas, North Central and East Central Texas

East Texas	$1.00
Corsicana (heavy) (June 17, 1933)*	.80
Other fields	(See gravity table)

Note—In East Texas, effective September 29, 1933, by Texas Co., Sanolind Crude Oil Purchasing Co., Humble Oil & Refining Co., Shell Petroleum Corp., Gulf Pipe Line Co., Tide Water Oil Co., Sinclair Prairie Oil Marketing Co., Magnolia Petroleum Co., Sun Oil Co., Panola Pipe Line Co., Empire Oil & Refining Co., and Atlas Pipe Line Co posted 60 cents per barrel in East Texas, but on November 3 resumed its posted price of $1 per barrel, making it retroactive to October 22.

*Magnolia Petroleum Co.

West Texas

Crane, Upton, Crockett, Howard, Glasscock, Mitchell (Sept. 29, 1933)	$ 7
Ector, Winkler and Pecos Counties and Lea County, New Mexico (Sept. 29, 1933)	.75
Pecos County, Yates shallow Pool (Sept. 29, 1933)*	.65
Jones and Fisher Counties*. See gravity table	

Note—Effective September 29, 1933, by Humble Oil & Refining Co., Texas Co., Gulf Pipe Line Co., Shell Petroleum Corp., Magnolia Petroleum Co., and by Stanolind Oil & Gas Co. in Winkler County, Texas.

*Shell Petroleum Corp.

Gulf Coast

Grade A and Grade B specifications discontinued by leading buyers.

	(See gravity table)
Tomball (see note)*	$1.15
Livingston (Sept. 29, 1933)†	1.00
Cleveland (Jan. 11, 1934)	1.00
Greta (Sept. 29, 1933)	.85
Refugio, light	(See gravity table)
Refugio, heavy (Sept. 29, 1933)‡	.85
Markham and High Island	(See Gulf Coast gravity table)
Conroe	(See Conroe gravity table)
Bosco, La. (Jan. 18, 1935)§	$.90

Note—Tomball, effective September 29, by Humble Oil & Refining Co. and October 3 by Magnolia Petroleum Co., and November 10 by Stanolind Crude Oil Purchasing Co

*Greta posted by Texas Co. †Shell Petroleum Corp. ‡Refugio heavy by Humble Oil & Refining Co. Cleveland (Liberty County) posted by Magnolia Petroleum Co. §Bosco posted by Pure Oil Co.

South Central and Southwest Texas

(See note below table)

Darst Creek	$.87
Mirando	.80
Luling (Sept. 29, 1933)	75
Pettus	1.05
Salt Flat	.87
Lytton Springs (Sept. 29, 1933)	.95
Duval County (Sept. 29, 1933)	.89
Saxet	.85

Note—Effective on September 29 by Humble Oil & Refining Co. in Darst Creek, Mirando, Pettus, Salt Flat and Saxet. Effective September 29 in Darst Creek by Gulf Pipe Line Co. and Texas Co. Effective October 2 by Magnolia Petroleum Co. Effective in Pettus and Salt Flat on September 29 by Humble Oil & Refining Co. and Gulf Pipe Line Co. Luling and Lytton Springs by Magnolia Petroleum Co. Duval County by Texas Co. Saxet, effective September 29 by

(Continued on Page 151)

TANK WAGON MARKETS

Quotations for gasoline and kerosene in United States, as furnished by the larger marketing concerns, include taxes

April 2, 1935

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline quoted is the regular or standard grade. In most marketing areas a third grade and a premium grade are also available.

Discounts

Under the standard form of commercial consumer contract which went into effect March 1, 1934, save in California, Oregon, Washington, Arizona and Nevada, a discount of 1 cent a gallon off tank wagon or 3 cents a gallon off retail prices is permitted for purchases running between 4,000 and 10,000 gallons a month, or 4 cents a gallon off retail prices for purchase in lots of more than 10,000 gallons a month. The minimum delivery is 25 gallons.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax	tank wagon
Denver, Colo.	18 0	20.0	5 0	13.0
Pueblo	17 0	19 0	5 0	13 0
Grand Junction	18 5	20.5	5 0	15.0
Casper, Wyo.	18.0	20.0	5.0	11 5
Cheyenne	18 0	20.0	5 0	13 0
Butte, Mont.	21 0	23 0	5 0	17 5
Billings	22.0	24 0	6.0	16 5
Helena	23 0	25.0	6.0	17.5
Great Falls	21.5	23 5	6.0	17 5
Salt Lake, Utah	21 0	23 0	5 0	16 0
Boise, Idaho	22.5	24 5	6.0	18.0
Twin Falls	22.5	24.5	6 0	18 0
Albu'que, N. M.	18 0	20.0	*6 5	13.0

*One-half cent city tax.

Effective March 1, 1934, discount to dealers with or without contract throughout Continental territory: Undivided dealer discount off service station price, 4 cents; divided dealer accounts, 3½ cents.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax	tank wagon
Chicago	14 6	16 6	4 0	9 0
Decatur, Ill.	14 5	16.5	4 0	9 4
E. St. Louis	14.2	16.2	4.0	9 1
Joliet	14.6	16 1	4 0	9 5
Peoria	14 5	14 5	4 0	9 4
Quincy	14 4	16.4	4.0	9 3
Davenport, Ia.	14.5	16.5	4.0	9 4
Des Moines	14.4	16 4	4 0	9 3
Mason City	14.7	16 7	4.0	9 6
Sioux City	14.6	16.6	4.0	9 5
Duluth, Minn.	15 3	17.3	4 0	10 2
Mankato	15 0	17.0	4 0	9.9
Minneapolis	15 0	17.0	4.0	9.9
LaCrosse, Wis.	15 7	17 7	4.0	9 9
Green Bay	15 9	17.9	5 0	10.1
Milwaukee	15 8	17 8	5.0	9.7
Madison	16.0	18 0	5 0	9 9
Detroit, Mich.	15 3	17.3	4 0	9 0
Grand Rapids	15.2	17 2	4.0	10.8
Saginaw	15 5	17 5	4 0	11 1
Evansville, Ind.	16.3	18 1	5 0	10.0
Indianapolis	16 4	18.4	5.0	10.1
South Bend	16.7	18 7	5 0	10 4
Fargo, N. Dak.	16 0	18.0	4 0	10 9
Huron, S. Dak.	16.5	18.5	5.0	10.4
Sioux Falls	15 9	17 9	5.0	9 8
Kans. C., Mo.*	13.9	15 9	4 0	7 5
Springfield	13.6	14 5	4.0	7.0
St. Louis	14.2	16 2	3.5	7 5
St. Joseph*	12 9	15 9	4 0	8 8
Wichita, Kans.	13.5	15.5	4.0	6 0
Bartlesville, Ok.	16.8	18 0	5.0	8 5

*State tax 2 cents, 1-cent city tax and 1-cent federal tax.

Discounts to dealers: Undivided accounts, 1½ cents on premium and regular and 2½ cents on third grade off service station prices; divided accounts one-half cent less than undivided. Where prices are more than 1 cent below normal, the discounts are one-half cent less than above.

Stanolex Furnace Oil in Chicago

Effective Feb. 16, 1935, f.o.b. Chicago tank wagon prices: Range oil, less than 80 gallons, 8½ cents; 80-149 gallons, 7½ cents; 150 gallons and more, 7 cents. No. 1 (36-40 lt. stw. zero), less than 100 gallons, 8½ cents; 100-149 gallons, 7½ cents; 150 gallons or more, 7 cents; No. 2 (30-34, stw. zero), less than 150 gallons, 8 cents; No. 3 (22-26, zero), less than 150 gallons, 7 cents; No. 4 (12-16 zero), less than 400 gallons, 7 cents; viscosity of No. 4, 55 and 100° F.; No. 5, less than 400 gallons, 5¾ cents. For deliveries of more than stated quantities of Nos. 2, 3, 4 and 5, deduct 1 cent.

(Note: Range oil not quoted by Standard; quotation on this product by Burning Oil Distributors Association.)

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax	tank wagon
Atlanta, Ga.	16 0	18.0	7.0	12.0
Augusta	19.0	21.0	7.0	15.0
Macon	19.0	21.0	7 0	13.0
Savannah	17.5	19 5	7 0	14 0
Birm'ham, Ala.	19 5	21 5	8.0	10.0
Mobile	18.5	20 5	8 0	11.0
Montgomery	20.5	22 5	8.0	15.5
Jackson, Miss.	18 5	20 5	7 0	13.0
Vicksburg	13 5	14.5	7.0	14 5
Jack'ville, Fla.	18 5	20 5	8 0	11.5
Miami	18.5	20.5	8.0	13 5
Pensacola	19.0	21.0	8 0	11.5
Tampa	18 5	20.5	8.0	12 5
Lexington, Ky.	18 0	20 0	6 0	11 5
Covington	16 0	17.0	6.0	12.5
Louisville	17 0	19 0	6.0	10.0
Paducah	17 0	19.0	6.0	8 0

In addition to the state tax of 4 cents on gasoline, Montgomery has city and county tax of 2 cents on gasoline and one-half cent on kerosene. Kerosene prices in Georgia and Mississippi include 1 cent state tax; in Alabama, an inspection fee of one-half cent on kerosene and one-fortieth cent on gasoline; in Florida an inspection fee of one-eighth cent on kerosene and gasoline. To Pensacola, Mobile and Birmingham state taxes on gasoline add 1 cent city tax.

Southwestern District

MAGNOLIA PETROLEUM CO.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax	tank wagon
Dallas, Tex.	14 0	16 0	5.0	8.0
Fort Worth	14 0	16.0	5.0	8 0
Houston	15 0	17 0	5.0	8.0
San Antonio	16.0	18 0	6.0	8.0
El Paso	16 0	18 0	5 0	10 0
Muskogee, Ok.	16.0	18.0	5 0	8.0
Okla. City	16.0	18.0	5.0	8.0
Tulsa	16.0	18.0	5 0	8 0
Ft. Smith, Ark.	14 1	16 5	5 0	8.0
Little Rock	16.6	19.0	7 5	9 0
Texarkana	14.0	16.0	5.0	7.0

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax	tank wagon
Atlantic City, N. J.	12 9	16.4	4.0	* 9.0
Newark	12.2	15 7	4 0	8 5
Annapolis, Md.	14 7	18.0	5.0	10 0
Baltimore	14 0	17.5	5.0	8 5
Cumberland	15.0	18.5	5.0	12 7
Wash'g'n, D. C.	12 0	15 5	3.0	9 5
Danville, Va.	16.5	20.0	6 0	12 9
Norfolk	15 0	18.5	6.0	11 3
Petersburg	15 5	19 0	6.0	11.4
Richmond	15 5	19 0	6.0	11 7
Roanoke	16 5	20 0	6 0	12.9
Charls'n, W.Va.	15.0	18 5	5.0	12.6
Parkersburg	14.0	17.5	5 0	11 2
Wheeling	14.5	18.0	5.0	12.2
Charlotte, N. C.	17 4	20 9	7 0	13.5
Hickory	17.5	21 0	7.0	13 7
Mt. Airy	17.5	21.0	7 0	13.8
Raleigh	17 2	20 7	7.0	13 3
Salisbury	17 5	21 0	7 0	13 6
Charleston, S.C.	15.2	18 7	7.0	11.3
Columbia	17.0	20.5	7 0	13 2
Spartanburg	16.0	19.0	7.0	13.5

Effective October 23, tank wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at regular price less one-half cent. Discount for kerosene, 1 cent off tank wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except in New Jersey, where no discount is given.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax	tank wagon
Omaha	16 9	18 9	6.0	10.0
McCook	17.6	19 6	6.0	10.7
Norfolk	17 3	19 3	6.0	10.4
North Platte	17.7	19.7	6 0	10.0
Scottsbluff	18.4	20.4	6 0	11 5

Note: Discounts to dealers; where service station gasoline prices are (maximum overall, including rent) as follows: Reliance, 2½ cents; Standard Red Crown, 3½ cents; Red Crown Ethyl, 3½ cents.

Where service station gasoline prices are below normal, resellers' allowances are reduced one-half of the amount below normal, down to the following (minimum overall, including rent): Reliance, 2 cents; Standard Red Crown, 3 cents; Red Crown Ethyl, 3 cents. Discounts to consumers for tank wagon deliveries covered only by Standard Commercial Consumers Contract, effective January 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Tank wagon	Service s.ation	Incl'ds tax	tank wagon
N. Orleans, La.	16.0	19.5	‡8.0	12.0
Baton Rouge	15.2	18.7	†7.0	12.0
Alexandria	16.1	19.6	††8.0	10.0
Lafayette	16.3	19.8	‡8.0	12.0
Lake Charles	16.2	19.7	††8.0	12.0
Shreveport	14.0	17.5	†7.0	12.0
Knoxville, Tenn.	17.7	20 2	8.0	13 5
Memphis	16.0	18.5	8.0	10.5
Chattanooga	17 0	19.5	8.0	11.0
Nashville	17.5	20.5	8.0	13.0
Bristol	17.0	20.5	8.0	14.0

*Includes city tax of 1 cent.

‡Includes 2-cent parish tax. †Includes 1-cent parish tax.

Effective October 23, tank wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at dealer price less one-half cent.

Louisiana kerosene prices include 1-cent state tax.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA.

	Gasoline			Kero.
	Tank wagon†	Posted retail	Incl'ds tax	tank wagon
San Francisco	16.5	18.5	4.0	12.5
Los Angeles	15.5	17.5	4.0	12.5
Fresno, Calif.	17.0	19.0	4.0	14.0
Phoenix, Ariz.	20.0	22.0	6.0	‡16.0
Reno, Nev.	19.0	21.0	6.0	15.5
Portland, Ore.	19.0	21.0	6.0	13.5
Seattle, Wash.	19.0	21.0	6.0	13.5
Tacoma	19.0	21.0	6.0	13.5
Spokane	22.0	24.0	6.0	18.0

*Retail prices posted by Standard Stations, Inc., a subsidiary.

†Prices are at company's plant or depots, as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where the discount is 1 cent.

‡Includes 5-cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO

	Gasoline			Kero.
	Tank wagon	Service s.ation	Incl'ds tax	tank wagon
Phil'delphia, Pa.	14.0	16.0	4.0	9.0
Pittsburgh	15.0	17.0	4.0	10.0
Allentown	14.5	16.5	4.0	10.0
Erie	15.0	17.0	4.0	9.0
Scranton	15.0	17.0	4.0	10.0
Altoona	15.0	17.0	4.0	10.0
Dover, Del.	14.5	16.5	4.0	10.0
Wilmington	14.5	16.5	4.0	9.0
Springf'd Mass.	13.0	16.5	4.0	8.5
Worcester	13.0	16.5	4.0	9.0
Hartford, Conn.	12.0	15.5	3.0	8.0
New Haven	12.0	15.5	3.0	8.0
Providence, R.I.	11 5	13 0	3.0	7.5

Note—Tank wagon prices are those applicable to consumers purchasing lots of 100 or more gallons in one delivery.

Canada*

Imperial 3-Star Gasoline

IMPERIAL OIL, LTD.

	Gasoline			Kero.
	Tank wagon	Service s.ation	Incl'ds tax	tank wagon
Hamilton, Ont.	†22.0	25.0	6.0	17.5
Toronto, Ont.	†22.0	25.0	6.0	17.5
Brandon, Man.	30.3	33.3	7.0	21.8
Winnipeg, Man.	‡7.7	31.7	7.0	20.2
Regina, Sask.	29.0	32.0	6.0	21.5
Saskatoon, Sask	31.8	34.9	6.0	24.3
Edmonton, Alta.	32.2	35.2	7.0	23.7
Calgary, Alta.	29 5	32 5	7.0	21.0
Vancouver, B.C.	27.0	30.0	7.0	24.0
Montreal, Que.	24.0	27.0	6.0	17.0
St. John, N.B.	26.0	30.0	8.0	19.5
Halifax, N. S.	26.0	30.0	8.0	19.5

*Imperial gallon used in Canada. †Governed by service station price.

Maritime provinces, all dealers 4 cents off service station price. All other provinces open dealers 3 cents per gallon off service station price (except Toronto and Hamilton cities which are—open dealers 2½ cents off service station price) 1 cent additional to 100 per cent accounts.

Naphtha

STANDARD OIL CO (INDIANA)

	Tank wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax nor 2 per cent retail occupational tax.

Prices f.o.b. Chicago, March 12, 1935. Each of above prices subject to discount of 1 cent per gallon for 150-gallon lots if covered by contracts.

New York and New England

SOCONY-VACUUM CO., INC

	Gasoline			Kero.
	Posted dealer	Service station	Incl'ds tax	tank wagon
Albany, N. Y.	13.5	17.0	5.0	8.0
Met. New York	12.75	15.5	5.0	7.75
Br'klyn, Queens	12.5	15.0	5.0	7.75
Buffalo	11.0	13.5	5.0	8.0
Rochester	13.25	16.0	5.0	8.5
Syracuse	13.25	16.0	5.0	8.75
Boston, Mass.	12.5	16.0	4.0	7.5
Portland, Me.	14.5	18.0	5.0	8.75
Manch't'r, N.H.	14.5	18.0	5.0	9.0
Burlington, Vt.	16.0	19.5	5.0	9.0

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Tank wagon	Service s.ation	Incl'ds tax	tank wagon
Ohio points	16.0	18.0	5.0	*12.5

*Includes state tax of 1 cent, effective July 22.

Retail Price Changes

Regular-Grade Gasoline and Kerosene

Atlantic Refining Co., March 26, reduced station gasoline 1 cent in Providence.

Standard Oil Co. of New Jersey, March 13, reduced tank wagon gasoline 1 cent and station gasoline 2 cents in Salisbury; March 21, advanced tank wagon and station gasoline one-half cent in Wheeling. March 22, reduced tank wagon gasoline 1.4 cents and station gasoline 1.9 cents in Spartanburg. March 12, reduced tank wagon and station gasoline one-half cent in Roanoke; March 13, reduced them one-half cent further; March 14, reduced them one-half cent further; March 21, advanced them 1.5 cents.

Standard Oil Co. of Louisiana, March 16, reduced station gasoline one-half cent in Chattanooga; March 19, reduced tank wagon and station gasoline one-half cent. March 16, reduced tank wagon and station gasoline one-half cent in Knoxville; March 18, reduced station gasoline one-half cent further. March 21, reduced tank wagon gasoline one-half cent and station gasoline 1 cent in Nashville.

Socony-Vacuum Oil Co., Inc., March 28, reduced tank wagon kerosene one-half cent in Boston.

Effective April 1, New York State gasoline tax advanced 1 cent to 4 cents making total state and federal tax of 5 cents and increasing tank wagon and station gasoline prices 1 cent throughout the state.

Effective April 1, gasoline tax advanced 1 cent in Province of Alberta, Canada, making total tax of 7 cents and increasing tank wagon and station gasoline prices 1 cent throughout the province.

Magnolia Petroleum Co., March 26, advanced tank wagon and station gasoline 3 cents in San Antonio; reduced tank wagon kerosene 1 cent in Texarkana.

CENTRAL TURNER VALLEY

In the Central Turner Valley Field, arrangements have been made to merge the New McDougall-Segur Oil Co. in the McDougall-Segur Exploration Co. The latter is probably the oldest oil company operating in the field, having started one of the two pioneer tests in 1912. McDougall-Segur Exploration's No. 1, drilled at the same time as the Dingman discovery well in Turner Valley, was located farther north, on the Waite Valley structure in SE Section 16-21-3w5, and failed to get production. The company, however, held extensive acreage in Central Turner Valley, and later organized the New McDougall-Segur Oil Co., a subsidiary which put down seven tests, three or more getting some production in the lime.

NEWS FOR PETROLEUM REFINERS

N.P.A. Announces Speakers for the Semiannual Meeting

The following are to be among the speakers at the general sessions of the semiannual meeting of the National Petroleum Association held in Cleveland, Ohio, April 18 and 19:

Charles L. Suhr, president, National Petroleum Association.

Baird H. Markham, director, American Petroleum Industries Committee.

Mortimer Berkowitz, the American Weekly.

Charles E. Arnott, president, Socony-Vacuum Oil Co.

R. M. Dilworth, chief engineer, Electro-Motive Corp. (subsidiary of General Motors Corp.).

Paul G. Blazer, chairman, Petroleum Code Survey Committee on Small Enterprises.

Paul J. Eakin, financial analyst.

H. L. Horning, president, Waukesha Motor Co.

Group meetings will be held Wednesday and Thursday evenings, April 17 and 18.

In addition, J. Howard Marshall, of the Petroleum Administrative Board, who is functioning in California in connection with the California Agreement, states that there is a strong probability that he will be in the East for the meeting, in which case he will address the association.

The fellowship supper will be held as usual at the Hermit Club at 6:45 p.m., Thursday, April 18. As this feature has grown in popularity to a point where the limited facilities of the Hermit Club are taxed to accommodate the representatives of the member companies and their guests, it is urged that reservations be made immediately. The entertainment will be under the direction of Fred Clark. The price of $3.75 covers the cost of the supper and the use of the club's facilities.

Fuel Oil Barges Open New Missouri River Program

The beginning of a new era of commerce was marked recently as the Bixby, a modern oil-burning craft left its moorings at Kansas City and moved down the Missouri River with a cargo of three steel barges each containing 42,000 gallons of fuel oil. The Bixby will stop at various government engineering points and deliver the oil for fuel barges and tow boats. Contract for the delivery of the oil is held by Jacob Wyatt, an oil operator. Transportation is furnished by the government boats under the terms of the contract, which calls for delivery of 2,500,000 gallons of fuel oil in March, April, May and June.

Loading the barges was effected by pipe line from the tank farm of the Phillips Petroleum Co. The Inland Waterways Corp. is responsible for this new development.

FUEL OIL ASSOCIATION

At the annual meeting of the Fuel Oil Association the following officers were chosen for the coming year: President, William R. Quattrocchi, of Warner-Quinlan Co.; vice president, E. M. Morrison, Jr., of Shell Petroleum Corp.; secretary, D. E. Kiernan, of Schildwachter & Sons; treasurer, Hy G. Fleer, of Fleer & Fleer.

On the board of directors, the four officers were automatically named with three additional men elected, namely, J. R. Brannan, Petroleum Heat & Power Co.; Edward J. Herbert, Vesta Oil Corp.; and J. T. Marks, Sunrise Oil Co.

The Texas Company Proposes Erecting Second Largest Solvent Unit in World

The Texas Co. has made plans for the erection of a 4,500-bbl. furfural solvent plant at its refinery in Port Arthur, Tex. This will be the second largest solvent plant in the world, based upon the charging capacity of the raw oil and also upon the volume of finished products.

The proposal does not state what will be used as a charging stock and sufficient flexibility will probably be designed into the unit to permit using either an overhead or a residuum. The final product will also be dewaxed by the use of solvents, acetone and benzol being the two to be used.

Upon the erection of the proposed plant, the Texas Co. will have a total capacity of 4,300 bbls. of solvent refined and solvent dewaxed lubricants daily, including the plant at Lawrenceville, Ill., operating under the subsidiary company, the Indian Refining Co.

At the present time approximately 23,000 bbls. of solvent refined lubricating oils can be produced in the United States according to a survey made by The Oil and Gas Journal and published in the issue of March 28, 1935, on page 83. The proposed plant will be able to produce approximately 3,250 bbls. of finished oils, which when added to the 22,200 bbls. of existing capacity, exclusive of the Texas Co., will bring the total for the country to 25,750 bbls. daily.

This includes an estimate of the capacity to result from the completion of the Shell Petroleum Corp.'s large unit at Wood River, taken as 2,500 bbls. of completely solvent refined and solvent dewaxed oils. Completion of the unit is expected within the next two months and represents an investment in special equipment of about $2,500,000.

The Bradford Penn Refining Co. is also building a Chlorex unit at its Clarendon refinery which will be completed within another month and will be able to produce from 270 to 450 bbls. of finished oil daily.

McMurray Properties Are Placed in Receivership

On a petition of the state of Texas, several McMurray controlled East Texas oil companies were placed in receivership March 30. The defendants of the alleged conspiracy to violate proration laws were R. J. McMurray, Lucille McMurray and M. H. McMurray, who are believed to control the Acme Refining Co., McMurray Refining Co., McMurray Corp., Acme Pipe Line Co., Tyler, Tex., Oil & Refining Co., Arpana Refining Co. and George C. Peterson Co.

The state charged the defendants "devised a plan and scheme to evade the conservation laws for oil and gas," in operating their properties. It asked penalties of $1,000 a day over a long period. The specific actions of the companies are listed by the state as follows: Production of large quantities of excess oil, failure to file reports required by the Railroad Commission, receipts and transportation of untendered oil, operation of wells without tubing and flares, and refusal to permit commission employes to gauge tanks or examine books.

The latest report states that the McMurray company filed $100,000 bond April 2 and has stayed the receivership order pending outcome of appeal.

KANSAS A.C.S. MEETING

The American Chemical Society, Southeast Kansas Section held a meeting in Coffeyville, Kansas, March 30. The meeting began with an informal dinner at the Dale Hotel. Following the dinner two papers were presented. Dr. Gardner of the University of Tulsa spoke on "The Present Trend of Solvents in Petroleum Refining." Dr. Chapman of Kansas State Teachers College, Pittsburg, Kans., talked briefly on the subject "Five Years of the A.C.S. in Southeast Kansas."

GASOLINE STANDARDIZATION

TORONTO, Ontario, Apr. 2.—A conference of gasoline producers and dealers with the National Research Council, held here last week, resulted in agreement on tentative plans for the standardization of gasoline and fuel oil prices in six Canadian provinces.

Egloff Presenting Lecture Series on Oil Refining

Dr. Gustav Egloff, Universal Oil Products Co., will give four lectures in March and April, as follows:

April 4—Western Petroleum Refiners Association, Excelsior Springs, Mo.: "Is the Oil Industry Becoming Synthetic?"

April 8—Kansas Oil Men's Association, Wichita, Kans.: "Modern Products from Petroleum."

April 26—American Chemical Society, Rhode Island Section, Providence, R. I.: "Modern Refining of Petroleum."

On March 21, Doctor Egloff addressed the DePaul Science Club of DePaul University, Chicago, on the subject, "Modern Motor Fuels and Motor Oil."

Monsanto Chemical Co. Effects Two Mergers

The boards of directors of the Swann Corp. and the Monsanto Chemical Co. approved a contract and will recommend to their respective stockholders the merging of the Swann Corp. into Monsanto.

The Swann Corp. has headquarters in Birmingham, Ala., and a plant in Anniston, Ala. A Swann subsidiary corporation, the Provident Chemical Co., has a plant in St. Louis, Mo., for the manufacture of monocalcium and disodium phosphate; another subsidiary, the Wilckes, Martin, Wilckes Co., has a plant at Camden, N. J., where lamp black, bone ash and phosphate salts are produced. The Anniston operations are electrochemical and produce phosphoric acid and its derivatives, calcium carbide, ferro phosphorus and abrasives.

The Monsanto Chemical Co. has also acquired the Atlantic Chemical Co. of Billerica, Mass., manufacturers of heavy chemicals. This company will be consolidated with the Merrimac division.

DEEP ROCK CHANGES OFFICES

Deep Rock Oil Corp. has discontinued its New York office formerly located at 111 Broadway, New York City. The Eastern Seaboard territory will be handled directly through the General Sales office at 155 North Clark Street, Chicago, Ill.

Fred E. Foster Manager California Association

Through action taken yesterday by the board of directors of the California Oil & Gas Association, Fred E. Foster, for the past three years secretary of the Pacific Coast Petroleum Industries Committee, was made managing director and secretary of the California Oil & Gas Association. His appointment is, in effect, a consolidation of the two organizations,

FRED E. FOSTER

for in addition to his new work with the association, Mr. Foster will continue his duties with the Petroleum Industries Committee.

Organized in 1906, the California Oil & Gas Association today represents 85 per cent of state oil business. The Petroleum Industries Committee was organized three years ago by the Pacific Coast marketing industry as a division of the American Petroleum Industries Committee to handle public relations work.

Mr. Foster, an engineer, is a graduate of the Carnegie Institute of Technology. During the world war, he was a colonel with the American expeditionary forces. Since the war, he has been identified with a number of California oil companies.

CANADIAN REFINERY PLANNED

EDMONTON, Alberta, Apr. 2.—The International Bitumen Co., Ltd., headed by R. C. Fitzsimmons is planning to erect this spring a $75,000 refining plant on the Athabaska River 50 miles below McMurray. The company owns some 10,000 acres of bituminous sand deposits on the Athabaska, and already has a small experimental plant on its acreage. Equipment for the new plant will be taken north as soon as the ice on the river breaks up, and the company expects to be producing gasoline, oils and paints by midsummer.

More than $300,000 is reported to have been spent already in experimental work as well as preliminary work on the bituminous sand concession. The Fitzsimmons group hold a controlling interest in the company, the balance of the holdings being in the hands of a small group of Edmonton and eastern men. The company controls a patent process for separating the bitumen from the sand. The bituminous sand deposits on its acreage are close to the surface and convenient to the river, facilitating transportation and development.

NATURAL GASOLINE MANUFACTURE

Paramount Corp. Permit to Strip Pledger Gas Revoked

The following order was issued by the Texas Railroad Commission revoking the permit to the named company to operate a stripping plant in the Pledger Field of Brazoria County, Texas.

Be it remembered that on the eighteenth day of February, 1935, pursuant to lawful notice, came on to be heard said above styled and numbered cause, and thereupon came the respondent; Paramount Natural Gasoline Co. of Fort Worth, Tex., its successors and assign, to-wit, Danciger Oil & Refineries, Inc., a corporation, with its Attorney Dudley Tarlton, and announced ready for trial; and thereupon the Railroad Commission proceeded to hear the evidence and argument of counsel; and from the evidence finds that:

1. Said cause, after due notice as required by law, was properly submitted:

2. Danciger Oil & Refineries, Inc., a corporation, is the present holder and owner of the special permit originally issued on April 6, 1934, to the Paramount Natural Gasoline Corporation of Fort Worth, Tex., as amended on December 5, 1934, by order of the Railroad Commission of Texas;

3. It is not in the interest of or conducive to the public welfare that said original permit, as amended on December 5, 1934, be further continued.

4. That the holder and owner of said amended permit, to-wit, Danciger Oil & Refineries, Inc., is wasting natural gas secured from the Pledger Field in Brazoria and Matagorda Counties, Texas, by blowing into the air the residue or tail gas and that many million cubic feet of gas, after being stripped of its gasoline content, is wasted each day and while a part of the record in this case discloses that certain local benefits will accrue by the continuance of the operations carried on under said amended permit, nevertheless, there are no existing circumstances or conditions which justify the continuance of the practice, pursued by the holder of said permit, of blowing the residue or tail gas into the air and wasting in such manner a valuable natural resource of this state, and the continuance of such practice under the conditions reflected by the entire record in this case is contrary to and is not conducive to the public welfare;

5. That in the interest of the public welfare and the conservation of gas as a natural resource of the State of Texas, the order of this commission issued on December 5, 1934, should be rescinded so that 30 days after this date all operations carried on by the holder and owner of said amended permit shall cease and hereafter all operations shall be conducted in accordance with the terms and conditions specified in the original Paramount Natural Gasoline Co. permit dated April 6, 1934, and not otherwise than in compliance therewith.

It is therefore ordered, adjudged and decreed that the order of this commission, entered herein on December 5, 1934, be canceled and annulled, such cancellation to be effective 30 days from and after this date.

It is further ordered, adjudged and decreed that the holder and owner of the original permit issued to the Paramount Natural Gasoline Co. of Fort Worth, Tex., on April 6, 1934, to-wit, Danciger Oil & Refineries, Inc., its successors and assigns, conduct no operations from and after 30 days from this date for the stripping of natural gas thereunder, save in strict compliance with the terms and provisions contained in said original permit dated April 6, 1934.

Reid Vapor Pressure Natural Gasoline Blends Must Be Accurately Controlled

By F. L. KALLAM

Industrial Engineers, Inc., Los Angeles, Calif

The volatility of a motor fuel is the per cent by weight vaporized under equilibrium conditions at specified temperature, pressure and air-fuel ratio. Today, volatility is considered as being the most important property of a gasoline. Under given engine conditions, the ease of starting, the rapidity of acceleration, and the likelihood of trouble from crankcase dilution and vapor lock, all depend almost entirely upon the effective volatility of some portion of the fuel. In view of these facts, it is rather surprising that there is no generally accepted test which measures directly the volatility of the fuel under conditions similar to those prevailing in service.

A large number of investigators have attempted to develop a practical continuous distillation method which would closely approximate the conditions of service in the engine fuel system. Such a program is enormously more difficult and lengthy than to carry out the well-standardized and generally accepted A.S.T.M. distillation test. In spite of the fundamental weaknesses of this latter method, it has fortunately been possible to correlate its results with the more precise and theoretically sound continuous air-distillation methods. As a result, satisfactory empirical relationships have been determined between the important volatility character of a motor fuel and certain points on the A.S.T.M. distillation curve.

The standard distillation data of a fuel permits the conventional plot of volume per cent evaporated against temperature. From this relationship, and the empirical data, the following features of performance for the gasoline under observation may be determined:

1. Possible starting; 8 per cent distillation point.

2. Easy starting; 10 per cent distillation point.

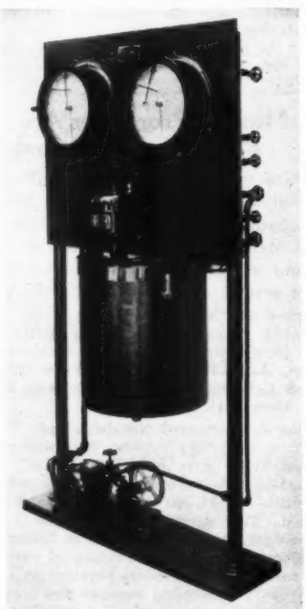
3. Quick warming-up characteristics, with choke; 35 per cent distillation point.

4. Good acceleration, without choke, steady, driving; 60 per cent distillation point.

5. Crankcase dilution during warm-up period requiring choke; 90 per cent distillation point.

Modern gasoline utilizes a large amount of light fractions for the purpose of giving the necessary ease in starting. The presence of large amounts of these light-ends is, however, not always a joy, because they tend to increase troubles from vapor lock and evaporation. Vapor lock is the partial or complete stoppage of gasoline flow in the automobile fuel feed lines due to the formation of bubbles of gas or vapor. It is serious when the gasoline commences to boil and this temperature is roughly indicated by the A.S.T.M. 10 per cent point. While this point is indicative of vapor lock with propane-free gasolines, it is not so satisfactory in the case of fuels containing more than a trace of propane. For this reason, the vapor pressure test is important, as it is satisfactory for all gasolines, and it now is a definite part of U. S. Motor specifications in place of the former minimum 10 per cent point. After extensive work with complicated laboratory vapor pressure methods it was concluded that the simple Reid method was sufficiently satisfactory for all practical purposes.

The higher the vapor pressure of the gasoline, the lower is the temperature at which boiling commences. Thus vapor pressure is the property of a gasoline which determines the boiling temperature, and hence, the vapor-locking tendency. In any given automobile operated under any chosen set of conditions, the fuel with the lowest vapor pressure can stand the greatest amount of heating before vapor lock occurs. On the other hand, a gasoline which is satisfactory in one automobile may give trouble in another due to differences in design of the fuel-feed system. Such differences are largely a matter of heat imparted to the gasoline as it flows to the engine. Similarly, a gasoline which is satisfactory in cool weather may prove troublesome from the standpoint of vapor lock in warm weather. Altitude likewise has an affect, for in elevated regions the temperatures at which boiling occurs is lower than at sea level.



Front view of vapor pressure recorder equipped with sample removal pump for operation on refinery gasolines where the vapor pressures are below atmospheric pressure

Accordingly, the four factors which affect vapor lock are:

1. Vapor pressure of the gasoline.
2. Design of the fuel system.
3. Atmospheric temperature.
4. Altitude.

Whereas vapor pressure determines the temperature at which boiling will occur at any given altitude, the atmospheric conditions and the design of the fuel-system determine whether the gasoline will be heated to its boiling temperature in service. Of the four factors, the two which can be controlled are gasoline vapor pressure and fuel-system design. In

(Continued on Page 150)

Work Begun on Turner Valley Absorption Plant

Work has been started on the new Royalite Oil Co. gasoline absorption plant in South Turner Valley. About 100 men are employed on construction and it is hoped to have the plant in operation by July. It will have a capacity of 75,000,000 feet a day, and will process gas from the Southern Lowery, Sterling Pacific, Sterling Royalties, Century Royalties, Merland and Mar-Jon wells. It is also prepared to process gas from independent companies desiring to take advantage of its facilities. S. G. Coultis, field superintendent, and J. McKay, construction superintendent, are in charge of the project. The location is in LSD 15, Section 34-18-2w5, on the former Sterling Pacific lease, taken over some time ago by the Royalite company.

The present Royalite gasoline absorption plant in the Central Turner Valley was completed in 1933, and processes around 90,000,000 feet a day, with a maximum capacity of 115,000,000 feet. The plant of Gas & Oil Products, Ltd., on the Mercury lease in Section 4-19-2w5, about a mile north of the new Royalite plant, was completed in September, 1934, has a maximum capacity of 80,000,000 feet a day and processes daily about 50,000,000 feet of gas with a recovery of from 250 to 300 bbls. of naphtha. It takes production from the Mercury, Miracle, Hylo, East Crest and Homestead wells.

The new Royalite plant will take some of its gas from the wells recently developed in Section 28-18-2w5. Its operation is expected to materially increase the field output, insuring a complete naphtha recovery and economic operation of wells with comparatively small gas production which could not be handled profitably by the separator method.

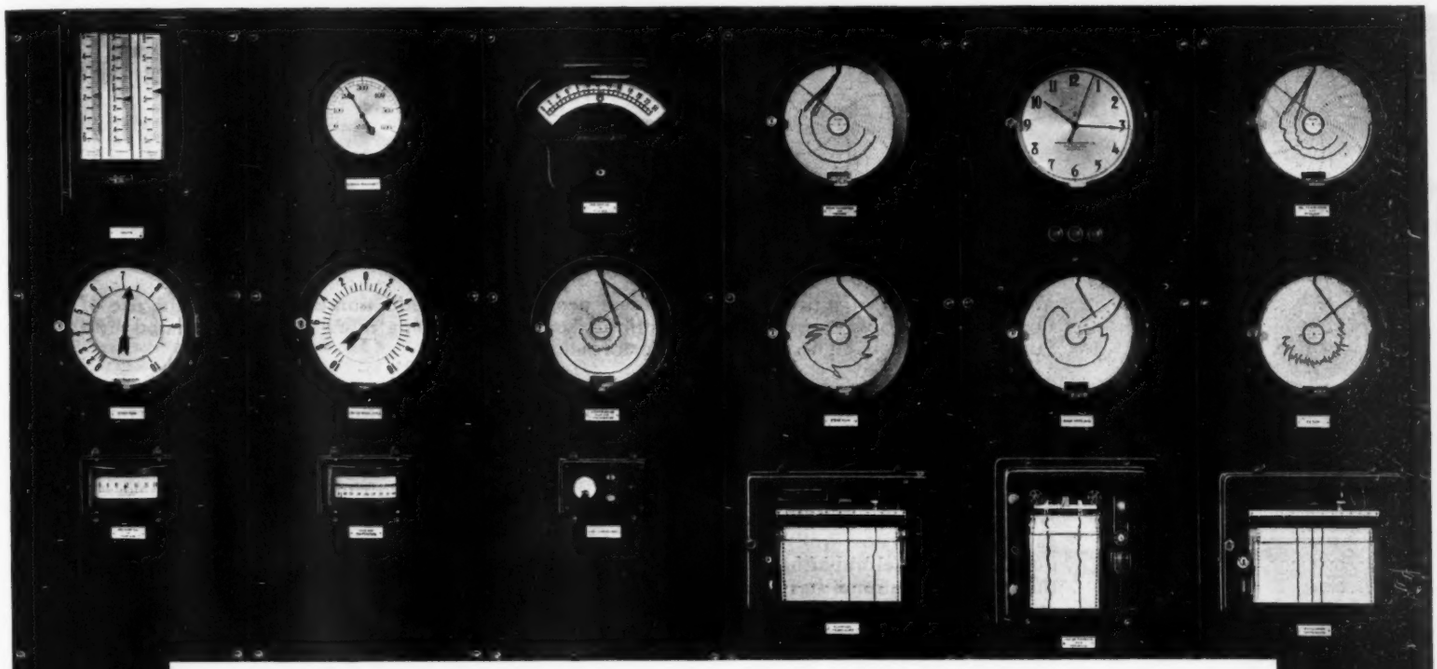
Allred Favors Texas-Owned Natural Gasoline Plants

In furthering plans for a state owned system of pipe lines and natural gasoline plants to handle gas from the Panhandle Field of Texas, Governor James V. Allred will request the Texas State Legislature to pass a bill creating the Gas Conservation Corp. The corporation will be authorized to negotiate for the purchase and sale of gas and the construction and operation of a pipe line to St. Louis and Detroit.

The State Gas Conservation Corp. also would operate natural gasoline plants transporting the gas after it has been processed to the two middle western cities it was stated. From each 3,000 cubic feet of gas 1 gallon of gasoline may be extracted at a cost of about 4 cents a gallon.

It is planned to seek an advance of $60,000,000 from the PWA to construct the line. The self-liquidating loan would be for 20 years, secured by bonds of Texas authority, according to R. B. Anderson, state tax commissioner, who has just returned from Washington where as Governor Allred's emissary he discussed the project with Secretary Ickes, who has given it his official approval.

Mr. Anderson said that a 26-inch pipe would give Detroit a maximum gas load of 33,000,000,000 cubic feet yearly and the pipe lines would have a capacity of about 400,000,000 cubic feet daily. Separate lines to St. Louis and Detroit would be necessary to supply the maximum requirements of each.



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For indicating, recording and controlling the level of petroleum and petroleum liquid products in tanks, towers, etc. at a distance. Catalog No. 6702.

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THE BROWN INSTRUMENT COMPANY, 4488 Wayne Avenue, Philadelphia, Pa.

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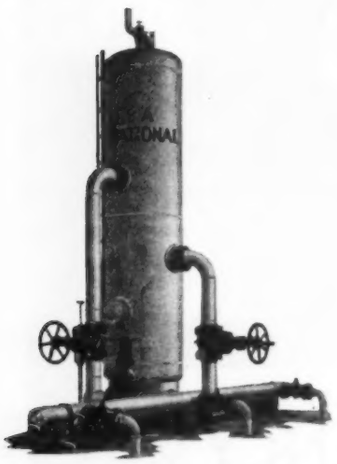
BROWN INSTRUMENTS

"to measure is to economize"

NATIONAL SEPARATORS FOR MULTI-STAGE INSTALLATIONS



A large gas company selects National Separators for stripping gas of condensible vapors in gas line service. A 4' x 16½' 400 lbs. W.P. National with A.I.C. control.

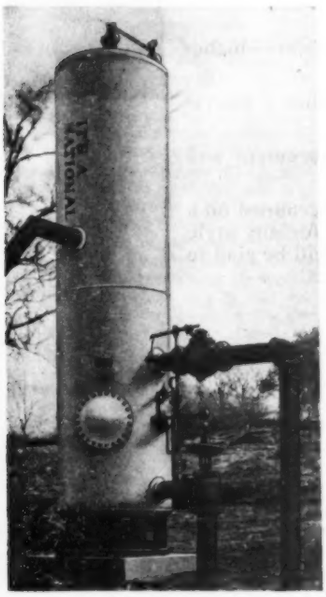
With the advent of more rigid economical programs for production conservation, the use of National Separators as an important medium of economy, is being more fully appreciated by those familiar with their high standards of performance.

The use of oil and gas separators is daily developing to a degree where they are given a place of due consideration in proper lease equipment for the control of that part of the production heretofore considered as being too expensive an operation to recover. As more knowledge is gathered on the subject, multi-stage installation of separators will come into more general use than in the past.

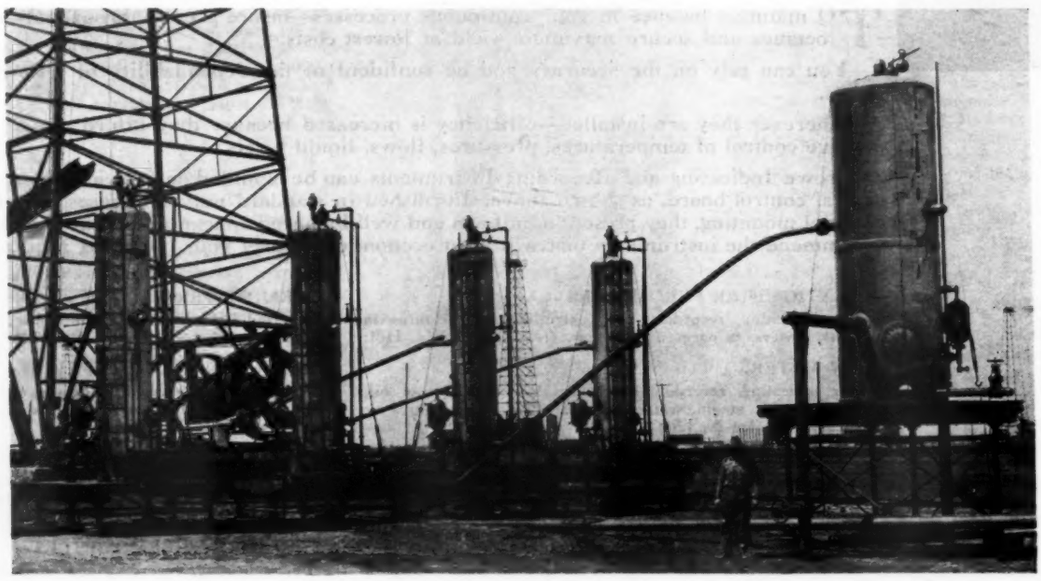
Already many operators are availing themselves of National equipment for conserving the oil and gas on high pressure wells as they are being brought in under unrestricted flow, effecting a production saving, eliminating of hazards and less possible damage to other equipment. In line with this practice National has developed the new Positive Dual Control separator which has set a new standard for fully automatic control at absolute minimum working pressure on all volumes of flow.

Further consideration of sources of possible economy is bringing to favorable attention of operators the benefits to be derived of multi-stage installations of separators. With attention being turned to waste gas and volatile fractions of crude in storage as potential sources of more complete recovery, more critical attention is brought to the merits of the separators used.

National has always led in developing that class of equipment which has given the type of performance necessary to the success of such economical programs. That is the reason that National Separators were selected for many of the first multi-stage installations in the Mid-Continent area and the results obtained will lead to an ever increasing use of such installations.



Users are enthusiastic about the new National Positive Dual Control separator pictured above. Performance records bear out the manufacturers' claims for an unequalled low pressure fully automatic operating unit. The above photo shows a 4' x 16½' 125 lbs. W.P. National Positive Dual Control. Ideal for final stage of multi-stage installations or for bringing in wells of large or small flow or for potential taking.



The above two-stage installation of National Separators as used in Oklahoma City field. Four 3' x 15' 500 lbs. W.P. National Separators for primary separators and one 5' x 15' 125 lbs. W.P. National giving low pressure separation of the oil released from the high pressure separators.

We are prepared to properly anneal all pressure vessels requiring annealing under A.P.I.-A.S.M.E. code at our plant in Tulsa.

SEE OUR EXHIBIT

See our exhibit at the Houston, Texas oil show. An unusual exhibit will be presented containing a transparent miniature Positive Dual Control National Separator in full operation, National Titeline Couplings and other equipment.

WRITE FOR BULLETINS

Those interested in oil and gas separators should have a copy of our bulletin No. 21 on "New Developments and Discussion of Automatic Oil and Gas Controls for National Separators." Two other instructive publications are also available, "Economic Comparison of Wooden, Bolted Steel and Welded Steel Oil Field Stock Tanks," Bulletin No. 19 and "Recommendations For Grades and the Care of Oil Field Tanks" Bulletin No. 20.

NATIONAL TANK CO., TULSA, OKLA.

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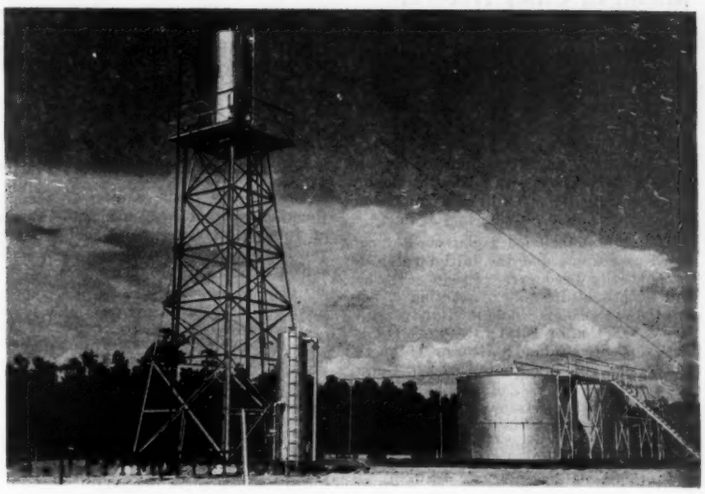
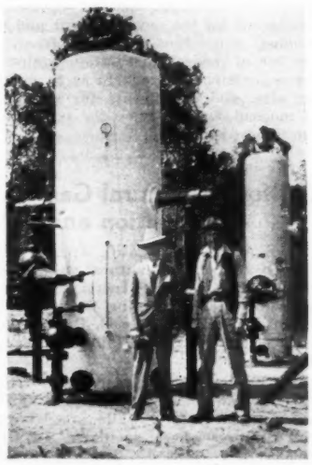
Multistage Separator Installations Are Coming Into General Operation



Two-stage separator hookup in the Conroe Field with the low-pressure separator elevated on a 30-foot steel tower to provide a gravity flow of the oil

Development on the Gulf Coast within the past few years of a new type of field in which wells produce a considerable volume of high pressure gas with a content of light distillate of slight, if any, color, is resulting in a greatly increasing need for separators in this district and is causing coastal operators to direct their attention to more efficient equipment and methods for extraction of the fluid from the gas.

Until comparatively recently Gulf Coast operators have not had to give much thought to separators and such equipment has not been generally used.



Two-stage separator hookup in the Conroe Field on the Gulf Coast. In the foreground are: W. J. Pliffner (left), superintendent for George W. Strake, and F. G. Love, separator and control regulator engineer

Coastal fields in the past have not been productive of gas to any extent, and also, at the same time operators have not been so much concerned over what now would be looked upon as wasteful practices. With the advent of gas producing fields on the coast there have arisen simultaneously conditions demanding the conservation of every possible resource.

Gasoline Plants

A new bill, which has a strong possibility of passing, is pending before the state legislature which would prevent the disposal of any gas produced which has not been completely stripped of its gasoline or distillate content. This bill, if passed, will compel the installation of gasoline plants because even in the most efficient separator operation it has been impossible to obtain more than a 60 per cent recovery of fluid from the gas. However, there will be a greater use of separators and necessity for more efficient separator installations.

It is known that the size of a gasoline plant is dependent on the volume of gas to be handled and that profitable operation of such a plant is contingent on the richness of the gas. Thus, in the case of this new type of coastal gas production in which the fluid content of the gas is relatively low but which at the same time must be recovered, a great volume of gas consisting of the lighter hydrocarbons can be stripped in proper separator installations while at the same time the remaining gas to be processed through gasoline plants will be more heavily saturated. By use of separators, efficiently operated, smaller and less expensive gasoline plants will be required and also, operation of these plants, handling richer gas, will be more profitable.

The gas which the Gulf Coast rapidly is getting into is of the same type which has proved so troublesome in the past in the Kettleman Hills Field of California, but which by multiple stage separator installation and scientific production methods operators have learned to handle very efficiently.

In the Kettleman Hills Field, two, and even three and four stage hook-ups, that is one, two and three stages beyond the high pressure separator, are being used generally. On the Gulf Coast no more than two stages, a high pressure and a low pressure separator, have been used and such installations have been made only in a few fields. Prevailing installations have been and still are of the single stage hook-up, in which stripping of the gas is accomplished in one operation through a single separator.

Two stage hook-ups were introduced on the Gulf Coast in the Conroe Field just two years ago, original installations being by Sun Oil Co. and George W. Strake, the latter the discoverer of the field. Conroe is not one of the so-called high pressure wet gas fields but two stage installations have been especially adaptable to conditions in that field.

Practice at Conroe

Special high pressure separators were designed for use with such installations at Conroe, where the volume of gas and oil production has been greatly curtailed by proration. The chief difference, however, in these special separators is one of size, they being only 2½'x10', or somewhat smaller than equipment ordinarily used. Each has a maximum operating capacity and at this pressure is capable of handling 5,000 bbls. of fluid and 10,000,000 to 15,000,000 feet of gas daily.

The units at Conroe are not called upon to handle that volume as on the present proration allowable basis the daily production of a well on a 20-acre unit, which is the maximum, is limited to 72 bbls. while the gas on the average will not be more than 60,000 to 100,000 feet daily. The output from seven to nine wells is being handled by single installations but each can be operated effectively with a gas volume as low as 100,000 bbls. daily.

The Conroe two stage hook-ups have effected not only a substantial gain in the recovery of oil from the gas but also there has been an increase of more than one degree in the gravity of the recovered oil. Well head pressures average around 700 pounds, and on the high pressure separators a pressure of 350 pounds usually is maintained.

Since these two stage hook-ups were introduced at Conroe, aditional installations have been made by the Pure Oil Co. in its Louise Field in Wharton County, and by the Texas Co. in its Port Neches (Bessie Heights) Field in Orange County. In the latter field there is one installation.

Survey of Fields

A survey of Gulf Coast and Southwest Texas fields and conditions which has been made by Fred G. Love, a recognized expert in the installation and operation of separators and control regulators, indicates that in the newer high pressure wet gas fields, or where high pressure gas is being produced in oil fields, separator hook-ups of at least three stages will be needed to obtain the highest degree of efficiency in operation and recovery.

It seems certain, according to Mr. Love, that the installation of such separator hook-ups will be very vital in those fields. In single stage separation, involving the use of a high pressure separator, it is estimated there is a loss in recovery of at least 20 per cent. If sufficient pressure is maintained on the separator to strip the gas, the lighter are held in saturation in the separator but when the fluid accumulated is run to tankage these lighter fractions, constituting various ends of gasoline, readily vaporize and escape. If pressures on the separator are lowered to an extent these lighter fractions are not held in saturation in the separators and are not run to tankage to escape, they vaporize in the separator and pass off the top as gas. In this case the gas taken from the separator would not be entirely stripped and under the proposed law now before the legislature would have to be run through a gasoline plant for extraction of the gasoline before disposal into a gas line.

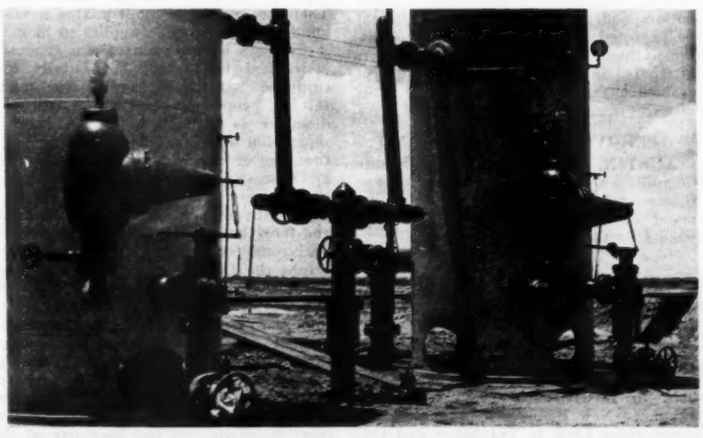
Multiple stage separator installations permit the maintenance of sufficient pressure on the high pressure, or first separator in the system, to strip effectively the gas passing from the separator. This gas sometimes amounts to as much as 75 per cent of the total charge. Being lean it would not have to be handled by a gasoline plant in aditional processing, thus eliminating the necessity of installation of sufficient gasoline plant capacity to handle it.

The recovered fluid and gas held in saturation under the high pressure of the separator then is discharged into the second separator on which a somewhat lower pressure is maintained. There some of the lighter fractions in the fluid which cannot be held in saturation at the lower pressures vaporize and pass off the top to be recovered again as gasoline in gasoline plant extraction.

Additional Stages Necessary

In handling production in which original pressures are not too high and in which there is a high oil content two stages generally are adequate, but for production largely gas with a high pressure and carrying only a light distillate content additional stages generally would be necessary. It usually is desirable to maintain on the last separator, whether it be the second, third or fourth, only sufficient pressure to boost the recovered fluid to storage. If the differential in pressure between the last separator and the preceding one is too great there

(Continued on Page 127)



Two-stage separator installation in the Louise Field, Wharton County, with an unusual hookup

Michigan Cities Natural Will Extend Its System

MUSKEGON, Mich., Apr. 1.—Michigan Cities Natural Gas Co., of Mount Pleasant, soon will start a several miles extension of its lines in Broomfield and Sherman Townships, Isabella County, following approval of a petition to lay the new gathering lines and become a common purchaser voted last week by the Michigan Public Utilities Commission following a public hearing in Lansing.

The request included a plat of the proposed extensions and the initial rates to be paid the producers. Producers who will be provided a new marketing outlet by the extensions include Bundy Hill Gas & Oil Co., of Flint; Rockfort Oil & Gas Co., of Midland; George Hanners and others, of St. Louis, Mich.; Chippewa Oil & Gas Co., of Midland; Youmans-Burke Oil & Gas Co., of Detroit; Broomfield Oil & Gas Co., of Detroit; D. F. Jones, of Mount Pleasant; R. D. Malcolm and others, of Flint; Max Pray and others, of Detroit; R. L. Hill, of Mount Pleasant; Fletcher-Lehman, of Flint; William Cline, of Mount Pleasant; Guy M. Obenauer, of Detroit; Wittmer Co., of Mount Pleasant; George W. Olsen, of Muskegon; W. J. Sovereign, of Bay City; W. J. Bernier, of Clare; Hiawatha Oil & Gas Corp., of Detroit; Arbaugh Brothers, of Mount Pleasant; Sherman Drilling Co., of Detroit; and Hal-Be-Oyle & Gas Co., also of Detroit, all of whom have developed gas production but have had no previous facilities for its sale.

About $40,000 will be invested in the new gathering lines, it was announced by Virgil W. McClintic, secretary-treasurer of the company. Gas will be sold to Consumers Power Co.

Byles and Lederer Oppose Wagner Bill

(Continued from Page 44)

resentation," Mr. Lederer told the committee.

"I can assure you, from my own knowledge and experience," Mr. Lederer stated, "that coercion and intimidation have been applied much more frequently and often more forcefully by employes who have been harangued by fiery orators, often not even belonging to the industry, and I am afraid such methods will be used to much larger degree in the future if this law goes into effect in its present form."

"It is not the intent of the law, nor the intent of the oil workers union officials that this should be, but they cannot control ambitious and misled members far away from headquarters," Mr. Lederer explained.

The "majority rule" propounded in this bill was severely attacked by Mr. Lederer who prophesied that it is the forerunner of the "closed shop" for all American industry, which is coercion of the cruelest kind, forcing a minority unwilling to pay the dues and submit to the by-laws of labor organizations, either to join in order to be permitted to earn a livelihood, or to be deprived of a job.

That provision of the proposed law which provides that the employer shall pay employes for time spent conferring with the management over problems arising out of the employment could be stretched into applying to a situation whereby the employer would be financing a strike called by his employes should the board rule that the employes, during such strike, were conferring with the employers, Mr. Lederer pointed out.

In concluding his remarks before the committee Mr. Lederer stated:

"Business has been in a quandary over national legislation and policies in the past, but depending on the apparent desire of the administration not to rock the boat has recently taken some heart, and his reaction is noted in the upward swing. You cannot bludgeon violators who abuse labor by such bills as this, as it strikes not only at the culprit, but penalizes the upright law-abiding companies; and I am convinced that the latter form the large majority in our industry at least. The passage of this measure will certainly retard recovery by the uncertainty of its effect on industry in general."

Taxability of Certain Naphtha Solvents Ruled

In response to a request by the National Petroleum Association, the Bureau of Internal Revenue rules as follows regarding the taxability of certain naphtha solvents:

"The distillation temperatures of the products referred to are as follows:

Napoleum Spirits

10 per cent, °F.	336
95 per cent, °F.	375
Flashpoint (Tag open cup), °F.	127

Stoddard Solvent

10 per cent, °F.	320
95 per cent, °F.	374
Flashpoint (Tag open cup), °F.	115

V.M.&P. Naphtha

10 per cent, °F.	236
95 per cent, °F.	296
Flashpoint (Tag closed cup), °F., below	60
(A.S.T.M.) Octane number, °F.	44
Reid vapor pres. at 100° F., lb.	0.8

Kleener Naphtha

10 per cent, °F.	236
95 per cent, °F.	296
Flashpoint (Tag closed cup), °F. below	60
(A.S.T.M.) Octane number, °F.	44
Reid vapor pres. at 100° F., lb.	0.8

"It is held that the products referred to fall within the class of products enumerated in Section 617(c)(2) of the Revenue Act of 1932, as amended, and that sales thereof on and after June 9, 1934, are subject to the tax imposed thereunder unless such products are sold under exemption certificates, obtained prior to or at the time of sale by the producer or importer, certifying that such products are purchased for use (1) otherwise than as a fuel for the propulsion of motor vehicles, motor boats, or airplanes, and (2) otherwise than in the manufacture or production of such a fuel. The products are not subject to the tax imposed under Section 617 of the Revenue Act of 1932 prior to its amendment by Section 603 of the Revenue Act of 1934."

Advanced Prices Create Confidence in Group 3

(Continued from Page 54)

are likely to begin buying for storage, but only as they are able to pick up bargains.

Kerosene was steady, with quotations where they have been with slight variations since last January, 3½ cents for the 41-43 grade and 3⅝ cents for the 42-44.

Wax a Disappointment

Wax continued weak, and concessions from the ruling quotations of 2 to 2¼ cents a pound for the 124-126 white crude scale were reported. Belief was expressed that this product had touched bottom and that a better demand might be expected soon. Wax has been a disappointment this year. Its weakness is attributed in some measure to failure of eastern buyers to absorb stocks.

APPROVES MARKET DEMAND

AUSTIN, Tex., Apr. 2.—The Senate Committee today approved without change the two-year extension of the market demand oil conservation law, as already passed by the House.

JANUARY CANADIAN PRODUCTION

Crude oil production in Canada during January increased to 124,654 bbls. compared with 117,113 bbls. in December and 124,425 bbls. in January, 1934. Alberta production was up from 105,804 bbls. in December to 110,424 bbls. in January; New Brunswick production declined from 1,025 to 784 bbls.; and Ontario production increased from 10,284 bbls. to 13,446 bbls.

Pennsylvania Refiners Favored Using Solvents

(Continued from Page 42)

mospheric or high, is an important consideration. If temperatures other than atmospheric are used, special insulation and heating or cooling equipment must be provided for.

"After choosing his solvent, the refiner must select the type of equipment suitable for extraction and solvent recovery. Solvent extraction equipment consists of some means of thoroughly contacting the oil and solvent, and separating apparatus. Centrifugal mixers are generally supposed to give the most thorough mixing. Where there is a large gravity differential between oil and solvent, and the viscosity of the oil is not high enough to prevent rapid settling of the extremely minute droplets of solvent through the oil, no doubt centrifugal mixing is the most efficient means of contacting. However, with stocks which contain compounds of extremely high surface tension, the droplets may be prevented from collecting and the viscosity of the stock may be sufficient to prevent settling so that emulsions will be formed.

Use of Tower

"The next best means of contacting is probably through a packed tower. However, refinements in this type of equipment have not reached a point where they are used to any extent in solvent extraction. Several types of solvent extraction equipment are now in use. These are, generally, single batch, in which fresh solvent is agitated with fresh oil and allowed to settle; multiple batch, in which the oil is agitated several times with fresh solvent; multiple batch countercurrent, in which the oil and solvent are passed countercurrently through a number of stages with treated oil leaving the plant contacting with fresh solvent in the last stage, and fresh oil entering the plant contacting with extract from the previous stage, the extract leaving the plant in this fresh oil stage; continuous countercurrent, in which the oil is continuously contacted with solvent for a time sufficient to bring about the desired result and without intermediate settling between stages. The multiple batch countercurrent installation is at present most generally used.

"If mixing is too thorough, settling may be difficult, and if not sufficiently thorough, loss of efficiency will result. The mixing required is a function of the selectivity of the solvent and should be carefully considered before any type of equipment is chosen. Probably the best type of mixer in the multiple batch countercurrent system is the orifice column. This column is composed of a number of plates containing orifices within the column. The oil and solvent is forced through these orifices and a number of zones of turbulence are set up giving sufficient mixing. The only objection to this type of mixing is that pressure drop through these columns is high and pumping costs increase with additional stages. There are several types of mixing nozzles, but the same objection applies to them.

"Settlers between stages are generally cylindrical tanks laid horizontally and equipped with float control for maintaining proper level. Their length and diameter is controlled by the ease of separation of solvent and oil, which is a function of specific gravity differential and viscosity as well as the capacity of the equipment. Settling takes place at a given rate for a given solvent and stock, and flow through the settler must be such that complete separation will take place before the float control position. Stages are usually connected with a pressure differential between them slightly greater than the pressure drop across the mixers so that one liquid will pass from stage to stage under its own pressure while the other liquid will be boosted in pressure by pumps. Careful control of interface levels is imperative in operation of extraction plants and has been one of the most troublesome problems encountered in these plants. Centrifuges are used to a certain extent as separators between stages; however, the number required is large and constant supervision is necessary.

Number of Stages

"The number of stages required to accomplish the desired results is a function of the selectivity of the solvent. Additional stages beyond a certain point merely run up the cost of equipment and require more solvent to fill the system. From four to six stages appear to be the maximum. The second half of the extraction plant is the recovery unit.

"Recovery units are usually the ordinary type of distillation equipment, though in many instances the method of applying heat is different. If the refiner has excess steam capacity, heat may be applied through heat exchange with steam. Ordinarily pipe stills are provided for delivering the heat required for distillation. Vacuum is almost imperative in any recovery unit with the commercial solvents. Most of these solvents decompose slightly at their boiling point and nearly all are slightly soluble in water so that a leaky condenser might cause losses not readily detected. The addition of vacuum to the equipment requires very little additional installation and operating expense, and will probably pay the biggest dividends of any piece of equipment at the plant.

"Solvent extraction, no doubt, is to become one of our principal tools in refining Pennsylvania grade oils. The problem facing the refiner is to choose the proper solvent for the particular job he wishes to do and then to choose the equipment for the most efficient and economical utilization of this solvent. By the use of modern distillation equipment for separation of products as to molecular size, and of solvents for separation of molecules as to type, the possibilities are almost unlimited."

California Natural Gas Production and Sales

LOS ANGELES, Calif., Apr. 1.—Production and sales of natural gas in California for 1934 showed increases over the preceding year, according to the annual report issued by Claude C. Brown, chief engineer of the State Railroad Commission.

Net production last year was 281,354,800,000 feet, as against 270,059,500,000 feet the year before, while sales to utilities and elsewhere compared 167,644,300,000 feet with 157,206,600,000 feet. The amount blown into the air last year rose to 16,720,000,000 feet, as against 12,183,600,000 feet the year before.

Amount used for repressuring and storage ran 3,852,800,000 feet, compared with 6,204,800,000 feet; gasoline plant, fuel and shrinkage was 47,586,300,000 feet, against 51,088,400,000 feet; field use 38,510,200,000 feet, as against 38,381,100,000 feet; and refiners' use, 7,041,200,000 feet, as against 4,995,000,000 feet.

MRS. P. H. QUINN DIES

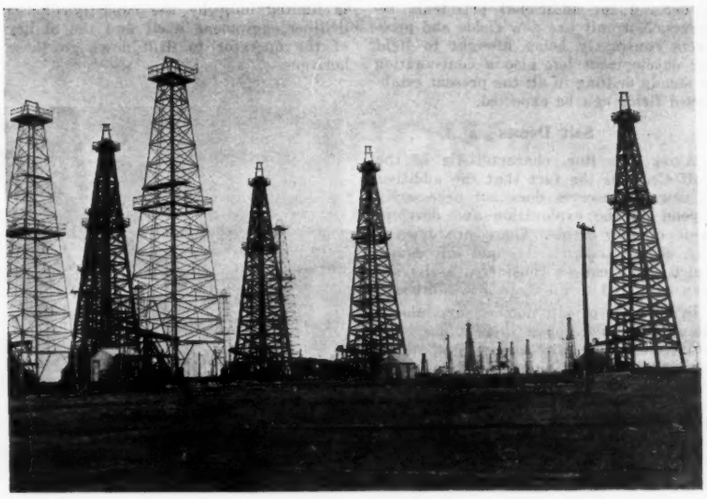
Mrs. P. H. Quinn, widow of the late Patrick Henry Quinn, died in Shreveport, La., March 30. She was a sister of John L. McMahon, Wichita Falls, Tex.; T. J. McMahon, Houston, Tex.; D. F. McMahon, Tulsa; Jim C. McMahon, Fremont, Ohio, and Tim McMahon of Gibsonburg, Ohio, and of Mrs. Charles P. Monohan of Pittsburgh, Pa., and Mrs. A. L. Parrish of Mannington, W. Va. Mrs. Quinn had been a resident of Shreveport for many years and was 64 years of age. Her husband died in 1921.

PUBLIC LAND HEARING

WASHINGTON, D. C., Apr. 2.—Public hearings will be held starting April 8 before the House Committee on Public Lands on H.R. 5,530 amending the Mineral Lease Act. Representatives of affected oil companies are expected to appear during the hearings which will last from three days to a week.

Extensive Development Program Is Assured in Gulf Coast Territory

By NEIL WILLIAMS
Gulf Coast Bureau, The Oil and Gas Journal



General view of portion of Barbers Hill field, Chambers County, Texas Gulf Coast

HOUSTON, Tex., Apr. 1.—Stretching from the eastern extremity of Louisiana westward and southwestward across the southern part of that state and South Texas to the Rio Grande River, a distance of some 700 miles, in a belt reaching 75 to 100 miles inland from the Gulf of Mexico, is the region known as the Gulf Coast, one of the most important oil reserves known to the petroleum industry.

There have been times in years past when it seemed every possible source of new production had been exhausted and that a decline in output might be expected. Each time some new discovery or development has opened the way for renewed exploration resulting not only in the finding of many new domes and fields but also the revealing of previously untouched sources of oil around the old fields.

It is not to be assumed from this that any great excess of Gulf Coast oil is to be made available for current consumption. True, in the intensive exploration and development program which has been going on for several years a number of flush fields have been, or still are being proved up, each of which might be capable of yielding several hundred thousand barrels of oil for the time being. Of chief concern, however, is the establishment of the reserves and the carrying out of a consistent and orderly program of drilling and production to provide an adequate supply of oil to be drawn on to meet actual requirements of the future.

Rate of Development

On the Gulf Coast, the proving of oil reserves is not an overnight undertaking. Years of wildcatting and drilling in an area sometimes are necessary before the rewards are obtained, which rewards, it might be stated, in most instances amply justify the cost and efforts spent in getting them. Advanced geophysical methods and increasing knowledge of interpretations of instruments and anomalies, together with more efficient drilling and development practices and better equipment, have served to reduce the hazard and uncertainty in coastal operations, but at best in most cases the development of a coastal field is a comparatively slow project. With few exceptions, Gulf Coast fields are owned and operated in their entirety by single companies or groups of companies jointly. The cost of geophysical exploration in locating prospective fields and the high valuation of meritable blocks, together with the large drilling expenditure usually involved in finding production, makes such control necessary. Under such conditions there seldom is any particular rush to drill up a field. Rather, it is customary to place only sufficient rigs in an area to fulfil obligations and keep these running steadily or as occasion demands over long periods of time, systematically developing the productive areas and various potentialities.

Thus, there are few local boom plays in modern coastal operations. Instead the drilling is spread out over the entire district with consistent development being carried on simultaneously in a great number of different areas and fields. From this standpoint, the Gulf Coast is assured of a more or less permanent extensive development program so long as there is

Louisiana Gulf Coast Fields and Proved Salt Domes

Field—	Parish	Type structure¶	Year dome proved	First prod.	Method of discov.	Total prod. to Jan. 1, 1935	Ttl. tests drilled Jan. 1, 1935	Ttl. prod. wells drilled Jan. 1, 1935‖	Prod. wells Mar. 1‖	Dly. av. prod. week end Mar. 1	Remarks
Anse La Butte	St. Martin	PSD	1902	1902	(*)	790,559	107	30	3	50	
Avery Island	Iberia	PSD	1862	....	(*)	.....	**3	0	0	....	Salt being mined
Bay St. Elaine	Terrebonne	PSD	1929	1929	(‡)	.....	15	3	0	Gas	Two shallow gas wells shut in
Bayou Blue	Iberville	PSD	1928	1929	(‡)	64,776	15	6	0	....	Last production 1933
Bayou Bouillon	St. Martin	PSD	1904	1928	(*)	439,837	47	9	0	....	No production since 1931
Bayou Des Glaise	Iberia	PSD	1929	....	(‡)	.....	6	0	0	....	
Belle Isle	St. Mary	PSD	1896	....	(*)	.....	††32	0	0	....	
Black Bayou	Cameron	PSD	1928	1929	(†)	1,770,395	32	11	7	897	
Bosco	Acadia-St. Landry	IDSD	....	1934	(‡)	1,034,353	35	28	28	15,355	Deep production
Caillou Island	Terrebonne	PSD	1929	1930	(‡)	1,707,822	13	8	7	6,850	
Calcasieu Lake	Cameron	PSD	1928	....	(‡)	.....	9	0	0	....	
Cameron Meadows	Cameron	PSD	1933	1931	(†)	558,247	13	9	7	1,135	
Chacahoula	LaFourche	PSD	1927	....	(†)	.....	††38	0	0	....	
Choctaw	Iberville	PSD	1930	1931	(‡)	670,685	††19	5	2	435	
Cote Blanch	St. Mary	PSD	1921	....	(*)	.....	††64	0	0	....	
Darrow	Ascension	PSD	1933	1932	(‡)	1,602	8	3	2	691	
Dog Lake	Terrebonne	PSD	1929	1929	(‡)	3,468	13	1	0	....	Small well pumped one year
Edgerly	Calcasieu	PSD	1927	1912	(*)	8,191,078	249	174	20	276	
East Hackberry	Cameron	PSD	1928	1927	(†)	9,110,294	152	100	51	5,640	
East Bay Junop	Terrebonne	PSD	1930	....	(‡)	.....	7	0	0	....	
Fausse Point	Iberia	PSD	1927	1927	(‡)	14,737	20	3	0	....	No production since 1928
Four Isle	Terrebonne	PSD	1929	1934	(‡)	21,067	9	1	1	750	
Garden Island Bay	Plaquemines	PSD	1929	1934	(‡)	.....	12	1	0	gas	Gas production only; one well shut in; shallow sands
Gillis	Calcasieu	IDSD	....	1934	(†)	50,048	5	3	4	1,676	Deep production
Gueydan	Vermillion	PSD	1931	1932	(‡)	490,809	13	4	4	232	
Houma	Terrebonne	Uncertain	....	Not known	(*)	.....	12	3	0	gas	Small, shallow gas wells
Iowa	Calcasieu-Jeff. Davis	IDSD	....	1931	(†)	9,145,834	62	53	42	19,295	Deep production
Jefferson Island	Iberia	PSD	1895	....	(*)	.....	**10	0	0	....	Producing sulphur and salt
Jennings	Acadia	PSD	1926	1901	(*)	46,635,587	628	516	34	1,144	
Lake Barre	Terrebonne	PSD	1929	1929	(‡)	9,007,275	41	29	17	6,850	
Lake Hermitage	Plaquemines	PSD	1934	1934	(‡)	545	6	1	0	....	
Lake Pelto	Terrebonne	PSD	1930	1929	(‡)	160,133	10	1	0	....	
Lake Washington	Plaquemines	PSD	1931	1931	(‡)	696,557	22	12	12	1,528	Also producing sulphur
La Rose (Valentine)	LaFourche	PSD	1934	....	(†)	.....	3	0	0	....	
Leesville	LaFourche	PSD	1932	1931	(‡)	4,991,960	77	63	63	17,751	Main development 1934
Lockport	Calcasieu	Uncertain	....	1924	(*)	12,714,831	145	112	23	1,617	
Napoleonville	Assumption	PSD	1926	....	(†)	.....	††16	0	0	....	
New Iberia	Iberia	PSD	1917	1917	(*)	155,060	36	5	1	175	No production 1930-34
Old Hackberry	Cameron	PSD	1902	1928	(*)	2,327,939	146	47	19	533	
Pine Prairie	Evangeline	PSD	1909	1912	(*)	17,500	35	4	0	....	Production short-lived; none since 1918
Port Barre	St. Landry	PSD	1929	1929	(‡)	3,988,145	51	37	26	4,410	
Roanoke	Jefferson Davis	IDSD	....	1934	(†)	239,229	11	4	5	1,651	Deep production only
Section "28"	St. Martin	PSD	1918	....	(*)	.....	13	0	0	....	
Sorrento	Ascension	PSD	1927	1928	(†)	562,230	30	4	3	20	
Starks	Calcasieu	PSD	1925	1927	(‡)	1,930,391	††76	28	18	645	First commercial production 1929
Sulphur	Calcasieu	PSD	1868	1926	(*)	7,254,289	**88	67	49	2,172	Produced only sulphur before 1926
Sweet Lake	Cameron	PSD	1926	1926	(*)	2,450,439	15	8	5	933	Deep production
Venice (Rose)	Plaquemines	PSD	1931	....	(‡)	.....	3	0	0	....	
Vermillion Bay	Iberia	PSD	1928	....	(‡)	.....	6	0	0	....	
Vinton	Calcasieu	PSD	1902	1910	(*)	42,018,017	604	421	83	2,968	
Weeks Island	Iberia	PSD	1897	....	(*)	.....	**5	0	0	....	
Welsh	Jefferson Davis	IDSD	....	1902	(*)	583,199	108	65	11	24	Shallow production only
White Castle	Iberville	PSD	1927	1929	(‡)	1,238,906	9	4	4	522	
						171,037,842	3,204	1,883	551	94,330	

*Surface evidence—includes such features as seeps, paraffin dirt, highly mineralized water, topographical mounds or other geological indications. †Surface and geophysics. ‡Geophysics. ‖Includes gas producers, but these are very few in number. ¶PSD—proven salt dome; IDSD—indicated deeply seated dome but dome not proved. **Sulphur or salt tests not included. ††Sulphur or salt tests included.

a demand for additional petroleum reserves. Not only are new fields and prospects constantly being brought to light for development but also a continuation of steady drilling in all the present established fields can be expected.

Salt Domes

Along this line, characteristic of the Gulf Coast is the fact that the addition of new oil reserves does not necessarily depend on the exploration and development of new fields. There are few, if any, of the known fields and salt domes which really can be considered as having been exploited in all their possibilities.

In the case of salt domes, particularly the so-called piercement type, it has been established time and again that there always is some additional source of new production to be developed. The structure of a typical salt dome is so complicated there may be production in shallow sands overlying the dome, in the cap rock immediately above the salt, or under various conditions in lateral sands flanking the dome on any or all of its sides. There are few domes, even among the oldest which have been drilled entirely over the top and around all sides. Even then, in the case of lateral sands, there is always the possibility of deeper productive horizons, exploration for which, in view of the great thickness of sedimentary deposition on the Gulf Coast, is limited only by the capacity of the drilling equipment itself and the ability of the operator to drill down to these horizons.

Also, it is conceded there still is much to learn about salt domes which may open the way for new drilling not even thought of or known now. It has been only in late years that the existence of "overhangs" has been revealed. So far these protrusions of salt or cap rock out from the main body of the salt and overlying sedimentary formations in which it is possible for productive sands to be found have been established on a limited number of domes, and it is not improbable similar conditions will be uncovered on many more if not all domes. At any rate the exploration for sands underlying possible overhangs on all the domes and the redrilling of the outer edges of the previously condemned salt area of these domes in an attempt to drill through salt will constitute another major drilling program and which no doubt will result in additional potential sources of oil supply. It is likely overhangs will offer explanations for the failure of many domes in the past to get important production in flanking sands, for in redrilling of these domes it may be found that the oil is in the sands high up under the overhangs.

Small rig powered by electric motor being used by one of the major companies in reworking of wells in Goose Creek

Non-Salt Dome Type

In fields of the non-salt dome type there also are possibilities for additional petroleum reserves although present producing horizons may be entirely drilled up. It has been variously estimated that sedimentary formations reach to as much as 20,000 to 25,000 feet below the sur-

(Continued on Page 88)

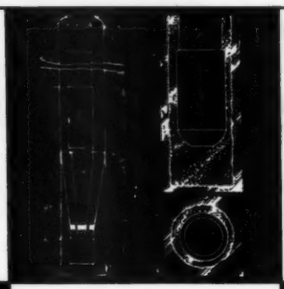
Upper Texas Gulf Coast Salt Domes and Fields

Field—	County	Type structure‡	Year dome proved	First prod.	Method of discov.	Total prod. to to Jan. 1, 1935	Ttl. tests drilled Jan. 1, 1935	Ttl. prod. wells drilled Jan. 1, 1935§	Prod. wells Mar. 1¶	Dly. av. prod. week end Mar. 1	Remarks
Allen	Brazoria	PSD	1925	1927	(‡)	69,896	36	4	1	15	No development since 1931
Ace	Polk	Conroe Trd.	....	1934	(††)	10,374	5	2	1	54	Producing wells are wet gassers
Anahuac	Chambers	IDSD	....	1935	(‡)	.....	1	....	....	....	Listing as field based on favorable drill stem test
Arriola	Hardin	PSD	1932	1932	(‡)	676,796	14	7	7	787	Top salt approx. 4,100 ft.; sand overlying dome
Barbers Hill	Chambers	PSD	1903	1916	(*)	44,461,827	568	423	159	18,538	First important production opened 1928
Batson	Hardin	PSD	1904	1903	(*)	36,263,587	1,394	1,166	164	1,029	Production from shallow sands and cap; deep sand opened 1934
Big Creek	Fort Bend	PSD	1922	1922	(*)	8,220,979	123	64	22	809	Shallow sands and flanks
Big Hill-Jefferson	Jefferson	PSD	1901	1923	(*)	12,000	48	3	0	....	Shallow dome
Big Hill-Matagorda	Matagorda	PSD	1902	1902	(*)	428,920	127	75	0	....	Produced shallow sands 1,902-05 ft.; deep sands undeveloped; now producing sulphur
Blue Ridge	Fort Bend	PSD	1903	1919	(*)	8,907,949	294	168	39	899	Shallow dome
Boling	Fort Bend-Wharton	PSD	1923	1923	(*)	5,742,247	420	312	70	343	Producing sulphur and oil
Brenham	Washington	PSD	1915	1915	(*)	235,807	90	70	29	29	Shallow sands; no deep drilling
Brookshire	Waller-Austin	PSD	1928	1934	(*)	4,963	13	1	1	45	Top cap 3,200 ft.
Bryan Heights	Brazoria	PSD	1901	....	(*)	.....	15	0	0	0	Gas well completed 1901 at 900 ft.; producing sulphur
Buckeye	Matagorda	IDSD	....	1932	(††)	455,374	6	2	2	86	Producing horizon 7,900 ft.
Clay Creek	Washington	PSD	1928	1928	(*)	2,873,508	81	46	35	811	Semi-inland shallow dome
Clemons	Brazoria	PSD	1926	....	(‡)	.....	14	0	0	0	Shallow dome
Cleveland	Liberty	Conroe Trd.	....	1933	(*)	176,930	11	6	6	409	Cockfield sand production
Conroe	Montgomery	Conroe Trd	....	1931	(*)	41,013,123	897	851	833	47,416	Cockfield sand production
Damon Mound	Brazoria	PSD	1901	1915	(*)	6,838,821	260	121	30	661	Shallow dome; top of cap on surface
Danbury	Brazoria	PSD	1930	1929	(†)	3,403	7	1	1	0	Top salt 5,220 ft.; production in shallow sand; shut in
Davis Hill	Liberty	PSD	1905	....	(*)	.....	43	0	0	0	Shallow dome
Dickinson	Galveston	IDSD	....	1934	(‡)	7,773	3	2	2	73	Frio production 8,000 ft.
Esperson	Liberty	PSD	1933	1929	(‡)	3,122,168	51	39	30	1,388	Top salt 7,200 ft. (one well only)
Eureka	Harris	IDSD	....	1934	(‡)	245	5	1	1	0	High pressure gas well
Fannett	Jefferson	PSD	1925	1927	(‡)	1,344,341	39	10	7	420	
Friendswood	Brazoria	IDSD	....	1934	(‡)	.....	1	1	1	0	High pressure gas well
Garwood	Colorado	Uncertain	....	1932	(*)	2,042	8	2	0	0	Inactive
Goose Creek	Harris	IDSD	....	1906	(*)	69,409,992	985	632	85	3,079	No salt or cap drilled
Hankamer	Liberty	IDSD	....	1929	(‡)	2,954,154	27	20	7	1,107	No salt or cap drilled
Hawkinsville	Matagorda	PSD	1926	....	(‡)	.....	18	0	0	0	Shallow dome; inactive since 1927
High Island	Galveston	PSD	1901	1922	(*)	8,268,729	186	76	44	7,018	
Hockley	Harris	PSD	1906	1923	(*)	15,854	71	4	1	0	Production dead; salt mined
Hoskins	Brazoria	PSD	1904	1904	(*)	31,755	45	6	0	0	Shallow production; 13 wells 1,904-07 ft.; inactive since
Hull	Liberty	PSD	1908	1918	(*)	75,696,878	846	675	203	6,468	Shallow dome; cap, shallow sand and Hank. prod.
Humble	Harris	PSD	1905	1905	(*)	117,857,855	1,577	1,240	230	3,096	Shallow dome; cap, shallow sand and Hank. prod.
Kittrell	Houston	Fltd. cond.	....	1934	(*)	38,252	18	7	7	339	Reklaw, Carrizo and Wilcox production; shallow
Livingston	Polk	Conroe Trd.	....	1932	(†)	1,116,315	**66	39	39	2,509	Six tests drilled in Sunshine area (north of Livingston Field); first as early as 1929; small pumper completed in 1930 from Hockley sand
Long Point	Fort Bend	PSD	1924	1928	(††)	.....	66	1	0	0	Production short lived; producing sulphur
Lost Lake	Chambers	PSD	1928	1929	(†)	694,382	28	11	8	207	
Louise	Wharton	Uncertain	....	1933	(†)	185,441	15	9	8	691	
Manvel	Brazoria	IDSD	....	1931	(†)	1,867,319	66	47	46	5,701	
Markham	Matagorda	PSD	1908	1908	(*)	5,095,768	251	122	28	1,363	
Moss Bluff	Liberty	PSD	1926	1930	(‡)	174,528	††55	6	0	0	Production abandoned 1933
Mykawa	Harris	IDSD	....	1929	(†)	456,263	23	11	6	480	No cap or salt drilled
Nash	Brazoria-Fort Bend	PSD	1924	1926	(†)	1,656,542	76	29	1	35	
North Dayton	Liberty	PSD	1905	1905	(*)	1,345,128	179	74	9	191	
Old Ocean	Brazoria	IDSD	....	1934	(‡)	18,876	1	1	1	322	Production 8,600 ft.
Orange	Orange	IDSD	....	1913	(*)	31,971,324	430	326	52	709	No cap or salt drilled
Orchard	Fort Bend	PSD	1924	1926	(†)	2,686,834	42	23	10	864	
Pierce Junction	Harris	PSD	1901	1921	(*)	27,700,624	419	242	62	2,795	
Pledger	Brazoria	IDSD	....	1932	(‡)	13,108	8	5	5	0	Completions are wet gassers; shut in
Port Neches	Orange	IDSD	....	1929	(‡)	2,240,428	22	16	13	1,580	
Raccoon Bend	Austin-Waller	Conroe Trd.	....	1927	(*)	13,632,712	227	176	97	3,794	Hockleyensis and Cockfield production
Rockland	Jasper	Fltd. struc.	....	1928	(*)	30,437	24	4	3	8	Shallow sands in basal Jackson or upper Yegua
Saratoga	Hardin	PSD	1901	1901	(*)	27,534,011	1,109	910	187	881	
Sour Lake	Hardin	PSD	1902	1902	(*)	76,545,125	1,580	1,259	180	1,564	
South Liberty	Liberty	PSD	1905	1925	(*)	14,503,075	417	280	39	439	
Spindletop	Jefferson	PSD	1901	1901	(*)	122,403,449	1,663	1,344	228	3,427	
Splendora	Montgomery	Conroe Trd.	....	1934	(†)	.....	8	1	1	....	Wet gasser; shut in; Cockfield production
Spurger	Tyler	Conroe Trd.	....	1932	(*)	.....	5	1	0	....	Gas well; abandoned
Sugarland	Fort Bend	PSD	1928	1928	(†)	18,516,571	75	68	34	5,946	
Thompson	Fort Bend	IDSD	....	1931	(†)	14,107,832	204	186	172	11,937	
Tomball	Harris-Montgomery	Conroe Trd.	....	1933	(†)	1,251,793	146	126	123	4,789	Cockfield production
Van Vleck	Matagorda	IDSD	....	1934	(‡)	12,353	2	2	2	....	Shut in; production 7,000 ft.
West Columbia	Brazoria	PSD	1915	1917	(*)	73,743,451	477	270	30	2,466	
Stratton Ridge	Brazoria	PSD	1913	1922	(*)	17,150	73	3	0	....	Produced shallow sands 1922
East Stratton Ridge	Brazoria	PSD	1930	....	(‡)	12,020	6	1	0	....	Development east of old field but believed twin dome or saddle
Genoa	Harris	IDSD	....	1929	(‡)	.....	4	1	0	....	Gas well completed; not commercial
Katy	Waller	Uncertain	....	1935	(‡)	.....	1	1	0	....	Gas well shut in; no drilling since
						874,529,031	16,115	11,632	3,402		

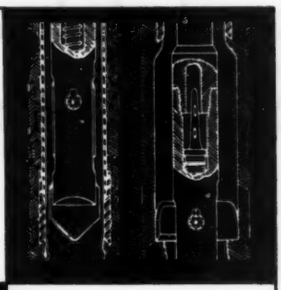
*Surface evidence—includes such features as seeps, paraffin, dirt, highly mineralized water, topographical mounds or other geological indications. †Surface and geophysics. ‡Geophysics. §Includes gas and distillate wells as these are comparatively few. ¶PSD—proven salt dome; IDSD—indicated deeply seated dome. **Includes six tests drilled in Sunshine area north of Livingston Field. ††Includes shallow sulphur tests; 26 tests drilled as oil tests, remainder combination oil and sulphur tests, one making shallow oil producer.

SEE THE COMPLETE LINE OF MODERN BAKER OIL TOOLS AT THE HOUSTON SHOW

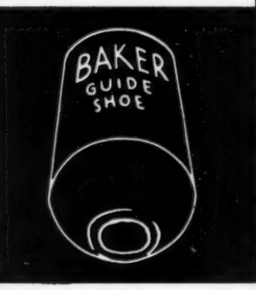
CAREFUL preparation of the hole before casing is run and the use of the most suitable cementing equipment give you the greatest assurance of obtaining a successful cement job. The diagrams show (a) a hole enlarged by underreaming with a Baker Rotary Wall Scraper to provide ample clearance for cementing a liner, and (b) a hole "bottlenecked" to assure distribution of cement completely around the shoe and shoe joint.



THE blades of the Baker Rotary Wall Scraper are folded inside the body (a) while running in and coming out of the hole. Positively expanded when pumps and rotation start they quickly cut their way out to the fully expanded position shown at (b). All the hole, or any desired portion of it can be reamed. Great depth does not affect the safe, easy operation of the Baker Rotary Hydraulic Expansion Wall Scrapers.

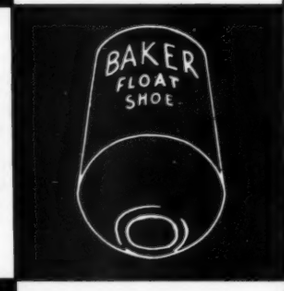


EACH of the seven sizes of Baker Rotary Wall Scrapers can be fitted with blades selected from a wide range of sizes, affording an amazing range of expansion. For instance, the No. 6 Wall Scraper will ream from 9¼ inches to 19 inches in diameter depending on the blades used, yet the largest O.D. of the body is only 7¾", same as a 6⅝" Standard A.P.I. tool joint.

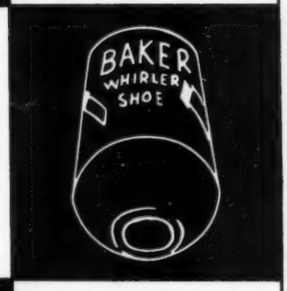


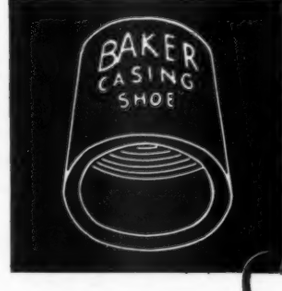
ONLY special Baker Formula Concrete is used in constructing the internal plug in all Baker Cement Equipment. Three times as strong as ordinary concrete, it assures strength beyond the collapsing strength of your casing. The Baker Cement Guide Casing Shoe will safely guide your casing. The concrete plug can be easily drilled up and circulated out of the hole, leaving it free from metal or objectionable matter.

THE double-seal valve securely anchored within the concrete plug of all Baker "Floating" Cement Equipment, whether Shoes or Collars, is constructed only of Bakelite and a special rubber sealing ring. The buoyant Bakelite ball valve provides a leakproof seal both while the casing is being "floated" into the hole and after cementing. The Baker Cement Float Shoe safely guides and floats your casing.



THE Baker Cement Whirler Shoe not only guides and floats your casing but assures a more complete distribution of cement. Side holes leading out of the valve chamber from below the valve are baffled to whirl the cement in an upward spiral about the pipe. Even though the bottom circulation hole is closed the side holes provide ample circulation and complete distribution of the cement.





THE Baker Cement Float Collar not only floats your casing safely, it also serves as a stop for the plugs used in cementing and assures a better consistency of cement around the casing shoe. In deep wells, where the investment is great and every precaution should be taken, it is considered good practice and good insurance to use a Baker Cement Float Collar in combination with a Baker Cement Float Shoe.

FOR cementing combination strings or cementing at any depth, the Baker Cement Whirler Collar provides maximum safety and assurance of success. The side holes, similar to those of the Baker Cement Whirler Shoe, permit free circulation of the cement and assure its even distribution by whirling it upward about the pipe. The canvas basket serves as an outside packer to prevent the cement or cavings from coming in contact with the oil sand.

Strength-Valve Efficiency-Drillability

With the cost of drilling the well at stake, experienced operators and engineers readily appreciate the necessity for taking every precaution to assure the success of cementing operations. Offering the ultimate degree of safety, only Baker Cement Equipment possesses the three essential qualities of *Strength, Valve Efficiency* and *Drillability* in *balanced* combination.

BAKER CEMENT EQUIPMENT

for guiding—floating—cementing casing

BAKER OIL TOOLS, INC.

POST OFFICE BOX 609 • HUNTINGTON PARK, CALIFORNIA

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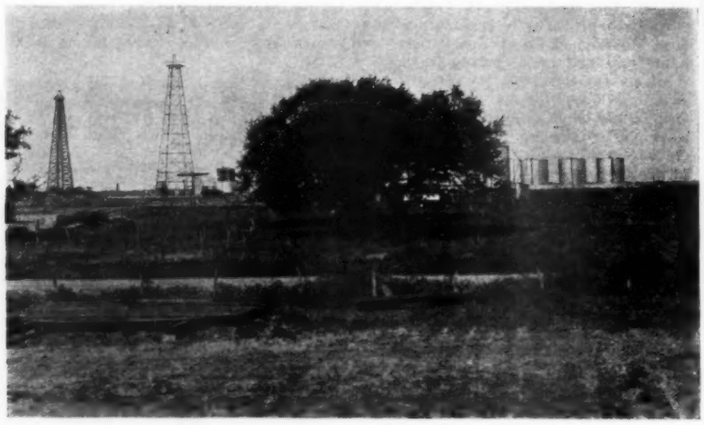
Southwest Texas Area Attracts Operators by Its Shallow Possibilities



Pettus field, Bee County, Texas

By F. L. SINGLETON
Gulf Coast Bureau, The Oil and Gas Journal

The Southwest Texas District, with its vast unexplored acreage, shallow producing depths, recent discoveries and the encouraging showings encountered in several wildcat tests drilled throughout the various counties, has become attractive to independent and major companies now carrying on an extensive development program in the attempt to open future oil reserves.

This district extends from the Brazos River on the northeast to the Rio Grande River and from the Lower Gulf Coast, northwest to the Edwards Plateau Region, and comprises four zones, generally known as the Fault Zone District, Laredo District, Lower Gulf Coast District and the Edwards Plateau area. Due to the diversity of geological conditions which prevail throughout this part of the state, many different types of fields have been uncovered, and are classified into seven groups. In the Fault Zone area, three different types exist. First, those which produce from the Edwards lime along the larger faults; second, the Serpentine plugs, in which the oil occurs in porous altered igneous rock, and third, the relatively shallow sands which produce under a variety of structural conditions sometimes accompanied by faults and sometimes not. The producing depths in the majority of the fields in this group do not exceed 2,700 feet.

In the Laredo District, the producing depths do not exceed 3,500 feet, with the most of the production being encountered in sands shallower than 2,500 feet. Wells drilled in this district penetrate three recognized producing horizons, the Cole, Government Wells and the Mirando sands. In the Coastal area, in the vicinity of the Refugio Field, production is found in deeper horizons in the upper Teritary sand at depths from 4,400 to 6,900 feet. Salt Domes, which have been the backbone of development on the Upper Gulf Coast, have produced only a small amount of oil, but it is generally believed now that deeply seated salt domes which exist in the upper Gulf Coast will eventually be found to exist in parts of the Southwest Texas District.

Balcones Fault Zone

The Balcones Fault Zone area is construed of a strip of counties extending from Williamson and Lee Counties in a southwesterly direction to San Antonio and thence due west to the Rio Grande River. The most important fields to be opened up along this strip of counties were the Luling Field in Caldwell and Guadalupe Counties, Salt Flat Field in Caldwell County, and the Darst Creek Field in Guadalupe County. These fields which are producing from the Edwards lime from 2,100 to 2,600 feet were discovered in 1922, 1928 and 1929 respectively, have produced a total of 126,698,225 bbls. of oil, which has been instrumental in keeping alive hopes of opening other fields of the same importance. A check on the number of wells drilled the past year in proven and unproven areas reveals that a total of 203 wells were completed. The total drilling now is 31, mostly wildcats.

Due to the three types of fields, different drilling methods are used. Serpentine work in fields such as Cedar Creek, Hilbig, North Dale in Bastrop County and Byersville, Chapman and Thrall in Williamson County, ranges from 1,000 to 2,500 feet, most of the production coming between these levels. Due to the fact there are no surface gas sands, nor other obstacles to prevent rapid drilling it is possible to complete a well in the 2,500-foot level within seven or eight days provided adequate equipment is used. In the Edwards lime pools drilling is more expensive due to section of Chalk and Limestone from 400 to 500 feet thick which has to be penetrated. A well drilled to the Edward lime can be completed within 30 days, which includes the setting of 200 feet of 10-inch surface casing and the setting of 7 inch casing on top of the lime. The average cost per well in the area on a turnkey basis is approximately $4,000.

Although many favorable prospects were condemned in the past year, there is no lack of interest on the part of operators to take up new favorable prospects. It is reported that approximately $2,000,000 was expended in this area for drilling operations the past year.

Due to the shallow producing areas, the never ending search for new serpentine production, with the low drilling and producing cost, this area will have considerable activity for many years to come.

Laredo District

The Laredo District comprises a number of more or less distinct pools in which most of the conditions pertaining to oil and gas are very similar. Production is obtained from a series of six or more lenticular sands ranging in age from Claiborne to Upper Fayette. The pools are on low folds of varying size generally cut by faults and it is the general opinion that production is due to the existence of closure along the faulted structures and to accompanying sand lenting. The producing horizons range in depth from 165 feet in the Charco Randolo Pool to 3,600 feet at the Roma Pool. However most of the large production is found at levels above 2,200 feet. Gravity of the oil in the various fields range from 18 to 42 degrees.

Recent discoveries, such as the opening of a deeper sand in the West Cole Field, Webb County, the Sam Fordyce Field, Southwestern Hildalgo County, the Loma Novia Field, Duval County, and a few others, has opened interesting possibilities in this area, consequently proven and unproven areas are seeing considerable activity at this time. In the southern part of the district, centering around the Sam Fordyce Field, Hidalgo County, independent major companies are doing considerable geophysical research work and several large blocks are reported to have been taken. In Hidalgo, Cameron and Starr Counties, there are 22 wildcat tests drilling or preparing to drill. Although a continuous development program has been going on in the West Cole Field, Webb County, ever since United Production Co.'s No. 1 Bruni opened a deeper productive sand from the 3,400 foot horizon, many locations remained to be drilled in the field. It is generally believed a deeper horizon exists in this field and a few proposed deep tests have been announced.

One of the attractions to operators in this district is the relatively short time in which wells are completed. Within two weeks after a well is spudded, a 2,500-foot hole can be completed including the coring and testing of the three horizons mentioned above.

Equipment Used

Drilling equipment used in the area is rather light, powered by steam or gasoline engines. In most cases derricks are of steel construction and range from 64 to 96 feet.

In proven and wildcat areas, two or three joints of 10-inch surface casing are cemented from top to bottom, and very seldom is another string of pipe run until oil or gas sand has been encountered. It is then customary to run 7-inch O. D. 17 to 28 pound casing, the weights depending upon the depth to be landed, and pressures anticipated. The casing is usually set just above the sand. Rock pressures ranges up to 800 pounds, with the pressure generally lower in the shallower areas. In the gas fields, which are numerous throughout the Laredo District, more precaution is taken in drilling, and much heavier casing is used.

In the Jacobs area, in the northern part of the district, similar drilling methods are used, except the producing horizon is found at around 1,000 feet, consequently lighter equipment is used, which makes the cost of a completed well in this area much smaller than wells in the Laredo District proper, which average around $3,000 against approximately $9,000.

Edwards Plateau

The Edwards Plateau area is composed of 10 counties, extending east of Val Verde County to Kendall County

(Continued on Page 93)

Lower Gulf Coast Fields

Field—	County	Year dis.	Total prod. Jan. 1, 1935	No. wells prod. Mar. 1	Total No. of wells drilled	Prod. depth	Gravity
Angelita	San Patricio	1934	25,973	1	4	5,382	31 5
Agua Dulce	Nueces	1930	121,507	14	47	1,975-4,900	29
Armagosa	Jim Wells	1931	Gas	2	4	2,800	....
Burnell	Karnes	1934	Gas	4	4	3,300	....
Caesar	Bee	1934	2,157	7	15	3,100	26
Coleto Creek	Victoria	1933	20,117	8	19	2,100-2,800	....
Coeden	Bee	1930	(*)	11	18	3,600	47
Dirks	Bee	1934	4,652	1	1	3,884	38
Edna	Jackson	1921	††Gas	10	17	2,800-5 300	....
Fordtran	Victoria	1934	Gas	1	3	2,900	....
Friendship	Bee	1930	Gas	2	4	3,500	34 6
Grayburg	Bee	1930	(*)	1	14	3,600	21 6
Greta	Refugio	1933	3,952,151	187	214	3,480-4,400-5,900	23.5-38.5
Gulf-O'Connor	Refugio	1932	(‡‡)	...	1	5,710	....
Hords Creek	Goliad	1929	Gas	1	4	4,232	....
Keeran	Victoria	1932	102,508	2	10	5,800	28
Kingsville	Kleberg	1926	619,648	7	56	1,400-2,100-2,900	21
Lobo	Live Oak	1920	Gas	4	8	960	....
Lucas	Live Oak	1923	76,813	6	56	2,200-5,277	23
Marbach	Live Oak	1934	Gas	1	5	500	....
McFaddin	Victoria	1930	(**)	1	42	2,000-3,700-5,832	24
McNeil	Live Oak	1930	14,624	1	2	4,300	....
Normanna	Bee	1930	(*)	3	10	1,920-3,647	38
North Pettus	Bee	1930	(*)	...	...	3,680	....
Oakville	Live Oak	1926	Gas	...	...	250	....
O'Connor	Refugio	1932	739,194	7	15	2,200-3,100-4,200	21-42
Palangana‡	Duval	1928	2,225	abd.	...	452	16
Pettus	Bee	1930	7,836,789	112	...	2,900-3,900	46-48
Pickett	Live Oak	1920	Gas	6	11	450	....
Piedras Pintas‡	Duval	1925	181,652	2	57	3,600	42
Port Lavaca	Calhoun	1934	1,234	1	...	6,168	58
Fremont	Jim Wells	1933	3,840	1	...	3,255	....
Refugio†	Refugio	1926	30,302,250	93	...	1,900-6,600	23-42
Sandia	Jim Wells	1929	.....	1	6	2,900-4,061	....
Saxet	Nueces	1923	2,269,418	27	93	2,408-4,800	25
Simmons	Live Oak	1926	Gas	9	5	200-400	....
Sinton	San Patricio	1934	.....	3	6	5,400	48
Slick	DeWitt-Goliad	1930	55,559	1	10	4,200	48
S.W. Pettus	Bee	1931	(*)	...	...	3,900	45
Stratton	Nueces	1931	Gas	1	...	4,800	....
Three Rivers	Live Oak	1922	Gas	10	20	250-900	....
Tomoconnor	Refugio	1934	32,302	5	...	5,600	38.8
Tuleta	Bee	1932	(*)	...	...	4,095	45.5
Vanderbilt	Jackson	1934	65,747	1	4	5,600	31.5
Weiss	Bee	1930	Gas	2	4	4,400	....
West Tuleta	Bee	1934	100,712	28	35	3,900	47.2
White Point	San Patricio	1930	61,099	1	59	1,900-4,902	23.4
Gyp Hill‡	Brooks	....	.....	...	...	....	....
			46,592,171				

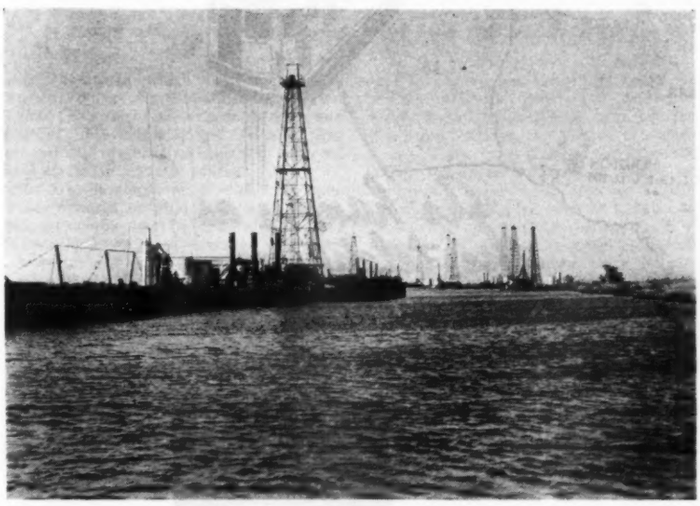
*Production included in Pettus. †First oil production 1928. ‡Indicated salt dome—no production. §Salt dome. **Includes O'Connor production. ††Some distillate. ‡‡Completed for gas well; drilled deeper and abandoned.

Submerged Regions of Gulf Coast Explored by Special Methods

Drilling operation of the Texas Co. in Lake Barre Field, Terrebonne Parish, Louisiana. Lake Barre is the upper portion of Terrebonne Bay. Piling foundations are being used in this case. Discernible at the extreme right, is an old tanker, which has been floated in and sunk to the bed of the water, and used as storage

Located as it is on the Gulf of Mexico, whose waters have receded from it only comparatively recently, as geological time goes, a large part of the Gulf Coast region consists of low, flat country, indented irregularly with numerous bays, lakes, bayous and other water courses. Drilling and production operations which have been carried on in some of these water beds, as well as in associated tide swept marshes and even off shore in the Gulf itself have constituted some of the most interesting and unusual phases of development on the coast.

In these water and marsh regions on and along the coast have been found some of the district's principal fields and it is entirely probable that further exploration and development will reveal a great many additional fields on submerged and marsh overlain domes and structures. There is no reason to assume that a shoreline defines the limits of productive possibilities, and the extensive area of so far unexploited water beds and even the adjacent Gulf of Mexico offers opportunity for exploration and development.



Leesville Field, LaFourche Parish, looking up Bayou LaFourche, main artery of traffic through the field. The field is located on both sides of the bayou extending back in the marshes, through which canals have been dredged to all the wells. All work is conducted from boats

Exploration for domes and structures on submerged lands and water beds has been retarded due to the natural difficulty of locating them. However, considerable success has rewarded previous efforts to locate such fields by geophysics as is indicated by the water located fields and domes being developed by the Texas Co. in southern Louisiana. Those fields and domes were discovered by geophysics as early as 1927. Since, there has been decided improvements and advancement in instruments and geophysical methods which make them still more practical and efficient in exploration of submerged properties.

The existence of possible major fields miles out in the Gulf of Mexico has been indicated by oil seeps. There is one seep more than 30 miles off the Texas coast which has been known for as long as 300 years, according to logs of mariners. Geodetic surveys have revealed mounds and ridges over the floor of the Gulf. These rise in many cases to within 25 feet of the surface and generally follow well defined lines of techonic characteristics. The floor of the Gulf naturally is only a continuation of the present coastal land, which in itself not so many ages ago, comparatively speaking, was under ocean water, and obviously there would be structural or domal conditions there also.

Submerged Lands

Considerable interest has been manifest in the exploration and leasing of submerged lands which have been going on lately along Texas coastal water beds. Previously most of this work as well as development of these beds has been directed toward coastal Louisiana. Humble Oil & Refining Co. within the last two months has leased an area of many thousand acres in the Gulf extending 3 miles off the shore of Jefferson County. Another spot of activity is Galveston Bay where thorough geophysical surveys are being made covering a wide area across the northern end of the bay and the adjacent Turtle Bay area at the extreme northeast end. As a result of the surveys, which are still under way, Stanolind Oil & Gas Co., one of the more recent entrants to the coastal territory but which has been extremely active in acquiring holdings and reserves, has leased from the state all of Turtle Bay and a large section of the northern end of Galveston Bay which Turtle Bay opens into, and is making plans and preparations for the development of the property. There long has been indication of the existence of a dome out in the bay off Smiths Point on the east shore about midway down.

Lavaca Bay, further down the coast, also has been a center of interest in leasing since the recent completion of a high pressure wet gas well on the shore near Port Lavaca at the upper end of the bay. It is indicated that the field may extend out into the bay a considerable distance. At least drilling will reach out into the bay.

Steps which Humble Oil & Refining Co. takes to develop its recently acquired property off the coast of Jefferson County will be observed with interest as the block extends out into water up to 40 feet deep. Drilling in water of such depths is not considered beyond the realm of engineering possibility although the providing of facilities for such an undertaking no doubt will entail a substantial expenditure. Hurricanes, high waves and tides constitute a grave hazard and obstacle for which precautions will have to be taken. However, some of the Texas Co.'s maritime fields on the Louisiana coast are in water up to 15 feet deep and exposed to the same conditions, and as far as the problem of development is concerned it does not matter much whether the water is 15 feet or 50 feet deep. Some operations have been conducted in the Pacific Ocean at depths of 30 feet, and special types of structures for such work have been provided.

Fleets Maintained

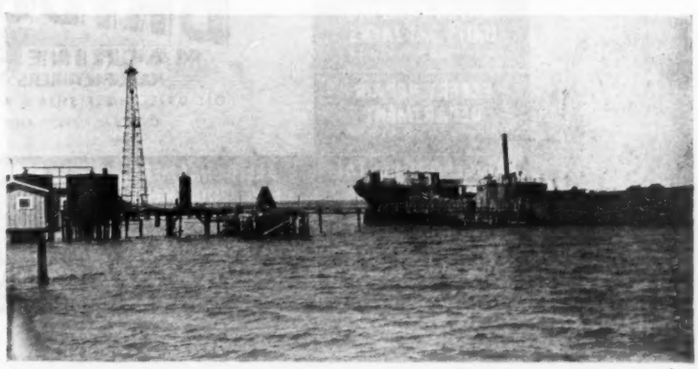
Maritime development projects on the Gulf Coast have necessitated the maintenance by a number of companies of sizeable fleets of boats of varying types, including barges, tugs and lugger for hauling equipment, supplies and materials; speed boats for transportation of personnel; and in some instances, houseboats to provide housing facilities in inaccessible places. Scouts and land men working in those areas where there are water located fields and projects also are furnished with fast boats for getting around their territory.

The Texas Co. keeps a fleet of approximately 85 boats running in its Houma, La., district. From a base of operations on Bayou Terrebonne, 22 miles south of the town of Houma, that company has been carrying on a maritime development project in proving up a group of eight salt domes on the coast of Terrebonne and Lafourche Parishes, and on a ninth dome at the mouth of the Mississippi River at the extreme southeastern tip of Plaquemines Parish.

Isolated in the vast marsh expanse in that part of the state, the Texas Co.'s operations have been one of the most unusual and outstanding developments on the Gulf Coast. Out of the nine domes which are being developed out of the Houma base, three fields of importance have been proved; oil or gas production has been opened on five others, while the ninth dome, although not yet productive, has been proved definitely as a dome.

Fields in Open Water

Three of the fields are located in the open water of Terrebonne Bay and Lake Barre (the upper end of the bay) in water ranging from 6 to 15 feet in depth. One of these, Caillou Island, located



Tanker, whose seagoing days are over, located permanently at Caillou Island, one of the Texas Co.'s maritime fields in Coastal Louisiana. The tanker's holds are used for storage, which eliminates necessity of driving piling and providing foundations for other storage. The oil is pumped from this storage tanker into seagoing barges, which carry the oil to waiting tankers out in deeper water of the Gulf of Mexico

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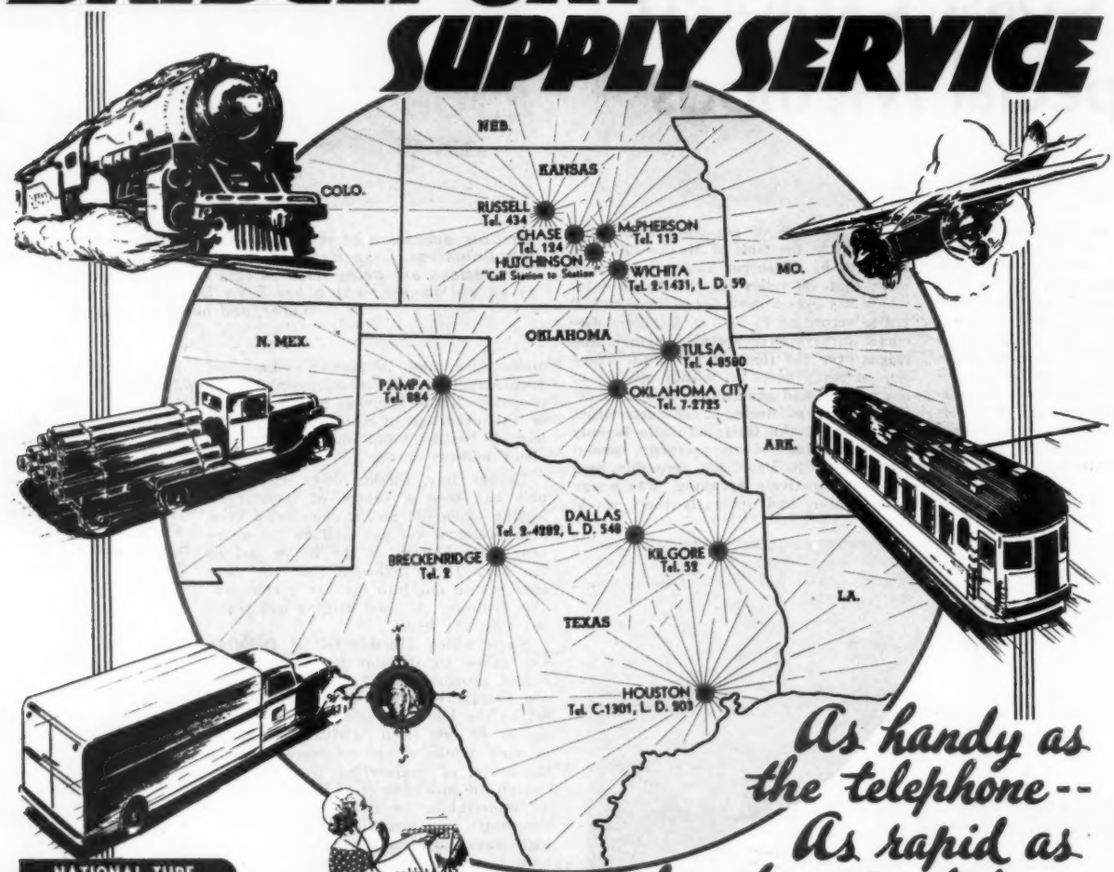

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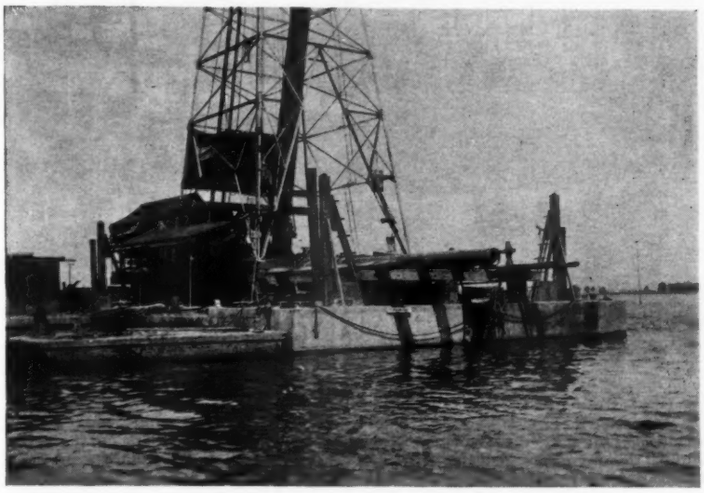
where the bay opens out into the Gulf of Mexico, is entirely out of sight of land and more than 25 miles across water from the company's base. Lake Barre the nearest dome to the base is 19 miles. The remainder of the domes except Garden Island Bay are back in the marshes adjacent to the bay and these are partially and sometimes wholly submerged. They can be reached only by boat through the natural or dredged channels and waterways which cut through the marshes out of Terrebonne Bay. Garden Island Bay also is in marsh land and reached only by boat but is some distance from the other domes and operated independently of the others.



Floating type drilling barge used in sulphur operations of Jefferson Lake Oil Co. in Lake Peigneur, Iberia Parish. This unit is electrically powered by means of cable connections to power lines strung across the lake

In the development of fields in open water exposed to winds, waves and tides, piling usually has been resorted to for foundations while in marshes and shallow water and some fields in land locked bodies of comparatively still water foundations laid on mats have been used fairly generally. However, within the past couple of years there has been an increasing use of drilling and boiler barges which have been proved very practical and which have eliminated to a large extent the necessity of providing special foundations for drilling wells and boiler installations.

These drilling barges are of two general types, namely, the floating barge, and the sea going submersible barge. The former type is particularly adaptable to drilling in still or protected water operations. Barges of this type have been for shallower and lighter drilling needs than the sea going barges, which are capable of withstanding the severest of conditions. Floating barges ride the surface of the water and are anchored in position. Barges of the submersible, sea going type are floated from location to location, but for drilling are sunk and rest solidly on bottom of the water beds with their hulls filled with water. To move them the water is pumped from the hulls, causing the barges to float.

In either type, the barges are completely equipped for drilling, being self-contained units with derrick, drilling machinery, mud pits, pipe rack and every facility of non-portable set-ups. A description of a floating type barge used in drilling operations in Lake Peigneur of Iberia Parish, was given in the May 10, 1934, issue of The Oil and Gas Journal. The barge so described is electrically powered by means of power lines strung across the lake.

The use of these barge drilling units not only has eliminated the necessity of providing extensive foundations, but also has been a factor in the saving of time and expense, and otherwise facilitating development. Boiler plant units permanently set up on barges also are being used. Diesel electric power plant barges also have been operated at several places for electric rigs.

Driving of piling for foundations is a rather costly undertaking. A foundation in the Texas Co.'s operations for a complete drilling rig, engine house, pipe rack, boiler house, fuel and water tanks, and slush pits, requires a total of 260 piles. Under the derrick corners 60-foot piles are driven, under the remainder of the derrick and engine house are 50-foot piles, while the remainder of the piles are 40 feet each. Approximately 30 days is required for driving and capping piling.

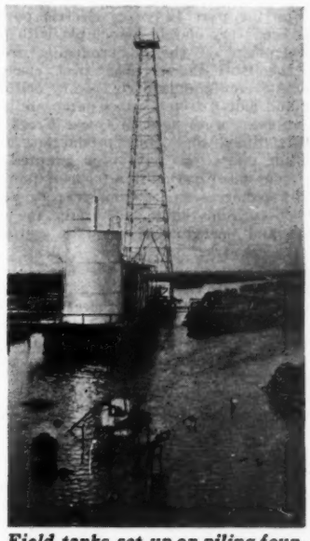
Piling foundations still are being used in some of the Texas Co.'s maritime operations as a sufficient number of drilling barge units so far have not been provided. Also, in the shallower water and marsh locations, matting foundations also still are being used largely. These consist of a flooring of timbers laid flat on the bottom with a cribbing built up to the desired elevation.

Floating type drilling barge used by Humble Oil & Refining Co. at Lake Washington, a marsh located in Plaquemines Parish, La.

Matting foundations also have been provided for wells which have been drilled by the Pure Oil Co. in its field in the middle of Sweet Lake, Cameron Parish. Sweet is a fresh water body varying in depth from 7 to 10 feet. The matting consists of several layers of planks laid down flat on the bed of the lake. The planks for each layer are fastened together on the surface and then lowered as one piece into the water.

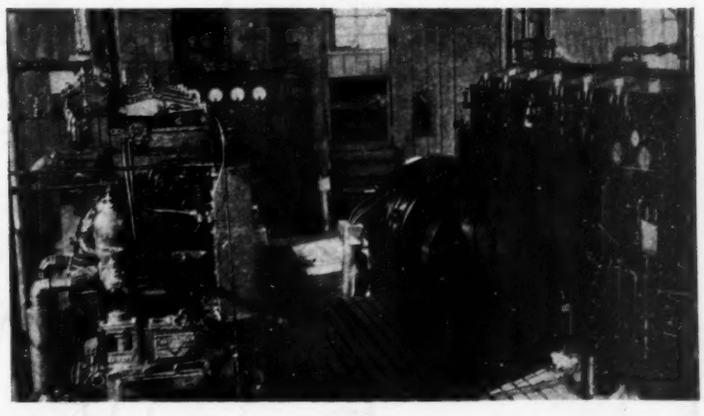
The Sweet Lake operations are very similar in type to those of the Texas Co. in Terrebonne Bay. Sweet Lake, however, is a land locked, fresh water body and the extent of the work is not so great. The field, while in the middle of the lake, is only 3 miles from the company's camp or base. On the other hand the wells can be reached only by boat, and the same problems as to setting up in a water location, handling of drilling and production, supplying of fuel, drilling mud, etc., prevail.

In some maritime and marsh operations providing of adequate supplies of drilling mud, fuel and good water is an important item. In the case of the Texas Co.'s operations a central mud mixing plant is maintained at the base of operations and the mud is barged to the various locations scattered over the district. Mud conditioning practices are observed in every instance at the wells and facilities are provided for conserving as much mud as possible. Approximately 1,000 bbls. of mud are needed for each well there. In the productive fields, fuel no longer is an item as in each case sufficient gas is produced for that purpose. However, for wildcat operations, the fuel has to be barged in the same as mud. Good water also is not available at locations and has to be barged from the base. Each of the wells, however, is equipped with steam condensers which recover a material volume of the water to minimize the amount to be hauled.



Field tanks set up on piling foundation at Lake Washington, Plaquemines Parish, Louisiana. In the background is the derrick of a well which had been completed recently. The canal in which they are located is one dredged across the marshes so boats could be used. The marsh land is incapable of supporting roads

Base from which the Texas Co. carries on its maritime operations on the coast of Terrebonne and LaFourche Parishes, Louisiana. It is on Bayou Terrebonne at a point 22 miles south of the town of Houma. Lake Barre, the nearest of the water-located fields, is 19 miles, being 12 miles down the bayou to Lake Barre and then 7 miles out in the lake. At the base are the general offices of the district, boat houses and repair shops, warehouse and material yard, commissary, and central mud mixing plant



Diesel-electric power plant barge "Energy" used by the Texas Co. in operation of electric rigs at Leesville, LaFourche Parish, Louisiana. The barge is towed to location, where it remains tied up during drilling operations. It carries power cables which are strung to drilling and slush pump motors

Use of Electric Power for Production and Drilling in the Gulf Coast Fields

By F. M. AUSTIN and P. H. ROBINSON
Houston Lighting & Power Co.

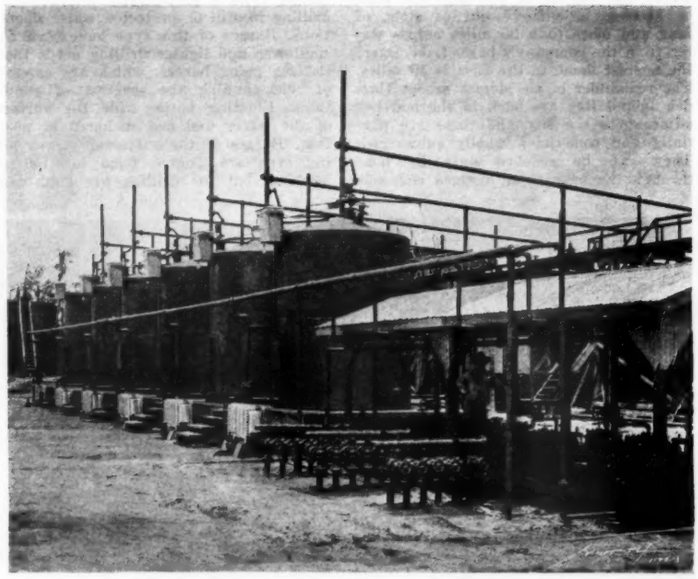


Fig. 17—Battery of treating tanks with electric dehydrators

For the past 14 years electric power has been very closely associated with the development of the oil producing areas in the Gulf Coast. The first electric motor driven standard rig, rotary drilling rig and motor driven water pump and air compressor were used in Goose Creek in 1921. Since that time production and drilling operations have been adapted to the successful use of this form of power, and its increased use from year to year has been remarkable, especially to visitors and operators from other sections of the country.

The rapid growth in the application and use of electric power is generally attributed to the fact that electric power is a flexible, dependable and satisfactory source of power. It is flexible because it can be used to advantage to perform any oil field service requiring power. It is dependable because records taken over a period of years indicate that, where continuous 24-hour-a-day operation is necessary to get production, the total enforced shutdown time has been less than 2 per cent, including failures due both to the source of energy and electric motors. This fact in itself, aside from the small cost of repairs, etc., has been a governing factor in the installation of electric motors in many instances. It is extremely satisfactory because it is clean, utilizes less space, carries a heavy load and is instantly ready for use when needed. In the territory of the Houston Lighting & Power Co. more than 85 per cent of the pumping wells are powered with electric motors. This is evidence that the early trend towards electrification of the Gulf Coast oil fields was fundamentally sound.

Another reason for the tremendous utilization of electric service has, no doubt, been the almost unbroken record of cordial relationships that have existed between the various oil companies and the utilities serving them. It is only natural that this condition should exist, since the electric industry is one of the largest users of petroleum products in the form of fuel for generating electric energy, for operating large fleets of passenger cars and trucks, and lubricating oils for many purposes. It is worthy of note that during the recent distressed condition of the oil industry, that without exception the utilities serving these companies did all that was in their power in the way of reducing rates and adjusting operating conditions to meet the changing needs within the petroleum industry. As an illustration, it is noted that since 1925 utility rates to the oil industry in this area have decreased approximately 42 per cent, and the trend is still downward, as contrasted with the increasing costs of all other commodities which the oil industry must purchase. This decrease in the cost of electric power has been made possible through improved efficiency in the generation and distribution of electric energy, coupled with increased volume of sales.

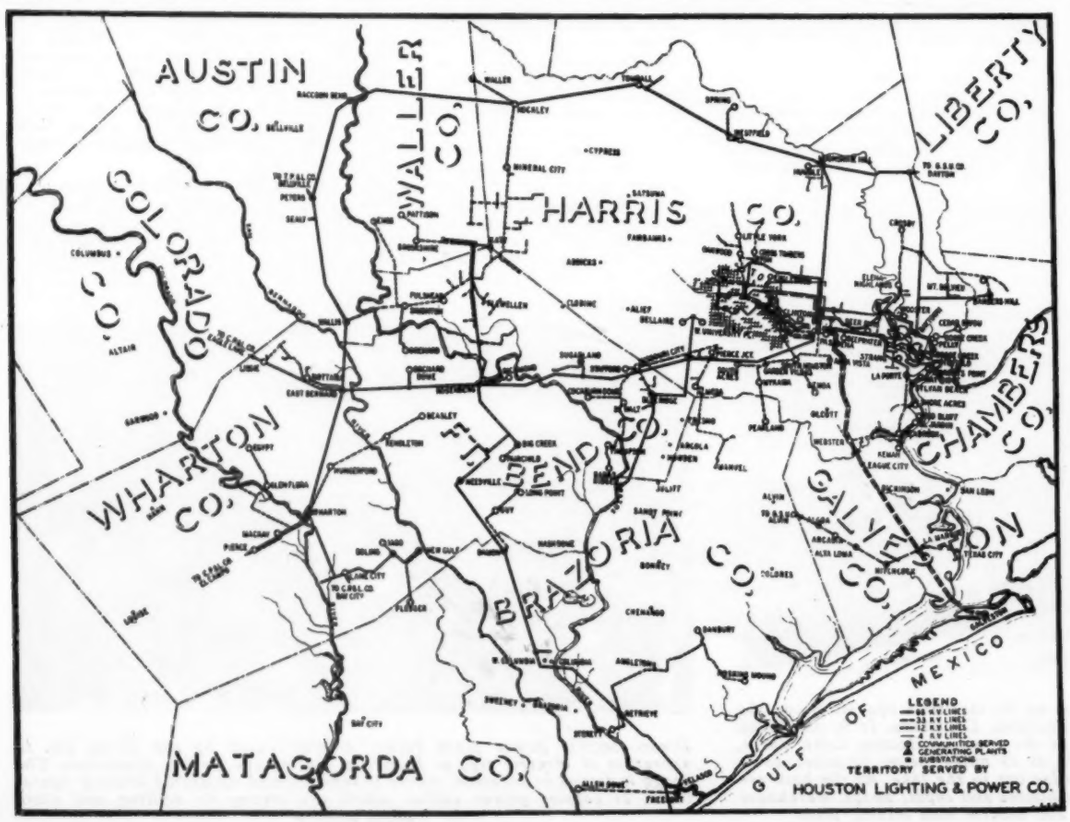
During the past several years radical changes have taken place in the production practices in the coastal fields. In the past, fields have not been developed according to any predetermined plan and generally uncontrolled production resulted in a rapid decline in the existing forces in the bottom of the wells which produced a natural flow. As a result of this practice it was a characteristic of the early fields that the power requirements would increase rapidly during the first two years of operation and probably reach a peak during that period. Power requirements would then just as rapidly decline, in practically direct relationship to the decline in production, finally leveling off after expiration of the initial flush production period. Other peak power requirements might occur after the initial peaks due to the discovery of new producing zones in the field. Contrasted with unrestricted production, controlled production is found in certain fields; in some cases due to one company owning practically all production acreage, but recently due to the efforts of the oil companies in the interest of establishing planned production.

The power requirements in fields where drilling was not restricted is graphically illustrated in Figure 1, where the total KWH used in the Barbers Hill and Pierce Junction oil fields is shown by years. It is reasonable to expect that the power requirements on practically any large lease in such fields would be similar to the characteristics of the field as a whole. This is borne out by the charts, Figure 2, showing the annual consumption on a large lease in the Goose Creek oil field and one in the West Columbia oil field. The load characteristics of fields under planned production is considerably different from other fields as indicated by the graph, shown on Figure 1. In fields of this type the oil is produced in a planned manner, and since the power requirements are always proportional to the oil produced, the load curve, after the initial rise, is relatively flat. The ultimate characteristics of such fields is unknown due to a comparatively short experience with such methods of operation.

In considering the tremendous variation shown from year to year in power requirements, it will be easily recognized that the great diversity offered by utility transmission systems could be practically applied to meet this problem satisfactorily and economically. This is especially true where a number of fields are served, under which condition it has been found that while some fields are undergoing a marked decline in service requirements, other newer fields will more than offset this decline.

Application to Typical Beam Pumping Equipment

The early electric pumping equipment consisted of a typical standard rig with countershaft arrangement for speed reducing purposes and a double rated, slip-ring oil well motor of either 15-35 horsepower or 20-50 horsepower rating. The reason for the use of this type of electric



equipment was to provide pumping and servicing operations at a minimum change-over cost. Another factor responsible for a great number of this type of early electric conversions was the fact that the operator was furnished with a pumping connection should be of maximum efficiency from a power standpoint. The slip-ring motor has inherently a lower efficiency and power factor than standard constant speed squirrel cage type motors, and while the performance

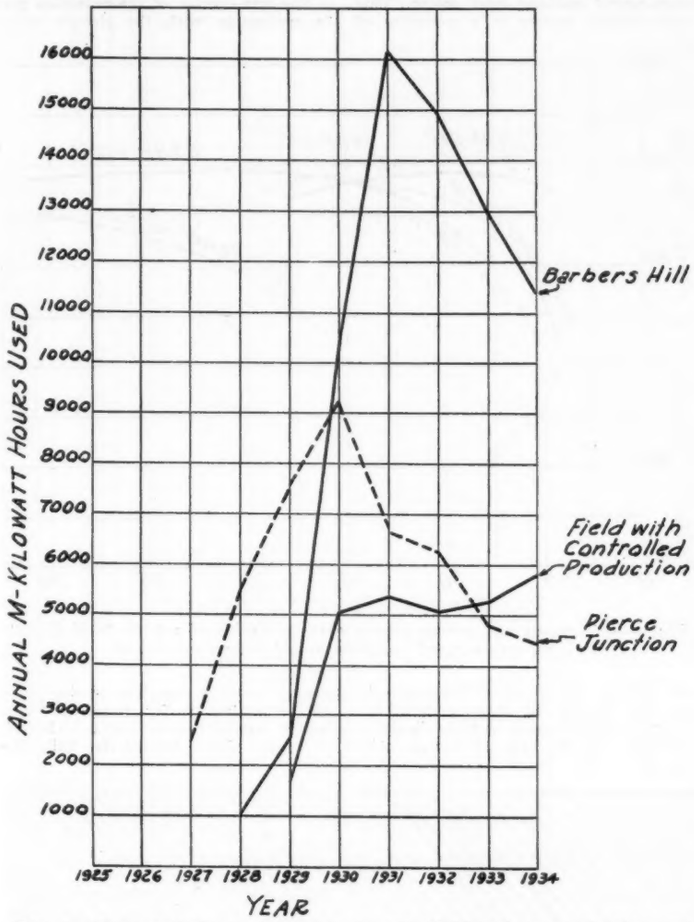


Fig. 1—Characteristic energy usage in two fields where production was not controlled and one field under controlled production

type of equipment which was operated substantially in the same manner as the older types of prime movers with which he was traditionally familiar.

The objections found to the application of the two speed double rated slip-ring motor was that, in most cases, the motor was too large for the pumping job. Since about 98 per cent of the total operating time is in pumping, it is obvious that the satisfied the various duties imposed upon it, it nevertheless was unnecessarily expensive to operate considered over a long period of pumping time.

Figure 3 will serve to show the efficiency and power factor characteristics of a 15-35 horsepower slip-ring motor.

Realizing the possibilities offered in increased efficiency through the use of squirrel cage motors, the next step in the electrification of pumping rigs was to introduce constant speed, double rated star-delta motors in which the change of rating was accomplished by a simple electrical switching arrangement. These motors provide a much higher efficiency and power factor than slip-ring motors as shown in Figure 4. The principal reason for using multiple rated motors is to permit pumping an oil well with the motor operated at or near full load even though the power requirements vary considerably during the life of the well. Changes in allowable production under proration, water encroachment, and changes in fluid level all cause variations in power requirements.

The development of the triple rated star-delta induction motor for oil well pumping has resulted from the necessity for economy in the fields where proration of production exists. As in the case of double rated motors, the only advantage is in the improvement in power factor and usually in efficiency on light pumping loads and the flexibility obtained in applying motors to wells operating under widely different conditions.

This type of motor is particularly suitable for conditions where the potential production of the well is high but the allowable production, now limited by proration, is low. The power required for pumping under present conditions is small and, therefore, the low rating of the motor can be used; when the allowable limit is increased, the intermediate rating of the motor will be required; and when the well is operated at full production, the high rating will be necessary. In some cases the low rating might be used for present production, the intermediate for ultimate production, and the high rating used only for hoist work with a friction clutch hoist. In connection with the servicing of wells, however, the trend at present is toward a separate servicing unit, complete with drawworks, mounted on an oil field wagon or skids. In such cases the motor requirements for individual wells will permit the installation of much smaller motors with a resulting reduction in both initial investment and power consumption.

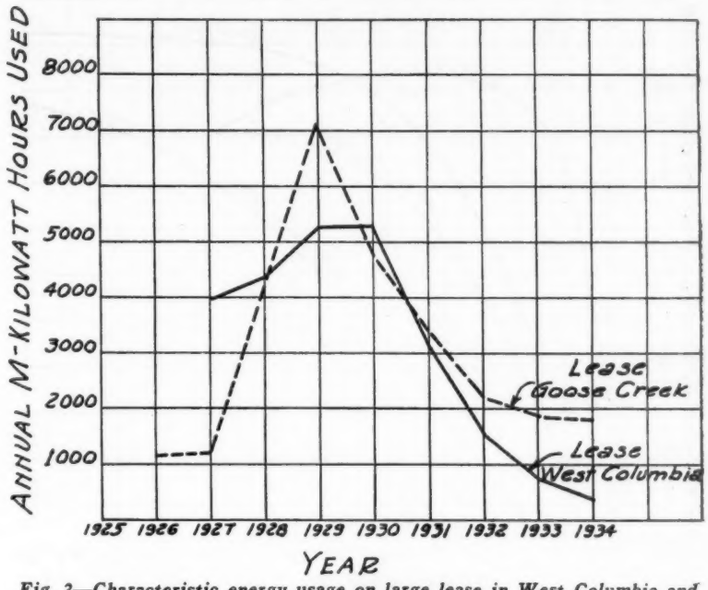


Fig. 2—Characteristic energy usage on large lease in West Columbia and Goose Creek oil fields

Figure 5 furnishes a comparison between the multiple rated star-delta and multiple rated slip-ring motors. As an example of the difference in efficiency of the star-delta and the slip-ring motor, with an actual load of 5 horsepower, the input to the slip-ring motor is 7 horsepower and to the star-delta 5.8 horsepower. With an actual load of 10 horsepower the input to the slip-ring and star-delta motors is 12.4 and 11.2 horsepower, respectively. With respect to the power factor, at 10-horsepower load the slip-ring motor has a power factor of only

59 per cent, whereas the star-delta motor has a power factor of 84 per cent.

A certain amount of experimental work has been carried on in the use of high-slip motors for pumping deep wells. The standard squirrel cage motor at full load operates at an average speed about 3 per cent below synchronous speed. The high-slip motor operates at from 10 to 15 per cent below the synchronous speed at full load. The inherent advantage of high-slip motor is that, when the motor starts to pick up the load on the up and down stroke, the speed of rotation decreases with a consequent reduction in the power requirement over that with a more nearly constant speed motor. This characteristic results in a reduction of both energy consumption and demand, and also reduces the stresses on all of the pumping equipment. A high-slip characteristic is obtained. Although this motor is less efficient on a constant torque load than a standard squirrel-cage motor, on a variable torque load such as a pumping well, it is actually more efficient due to the speed torque characteristics.

The introduction of the reduction gear in connection with the electric motor brought about a complete revolution in surface equipment for pumping wells, since it offered the operator a highly efficient and almost trouble free unit. The

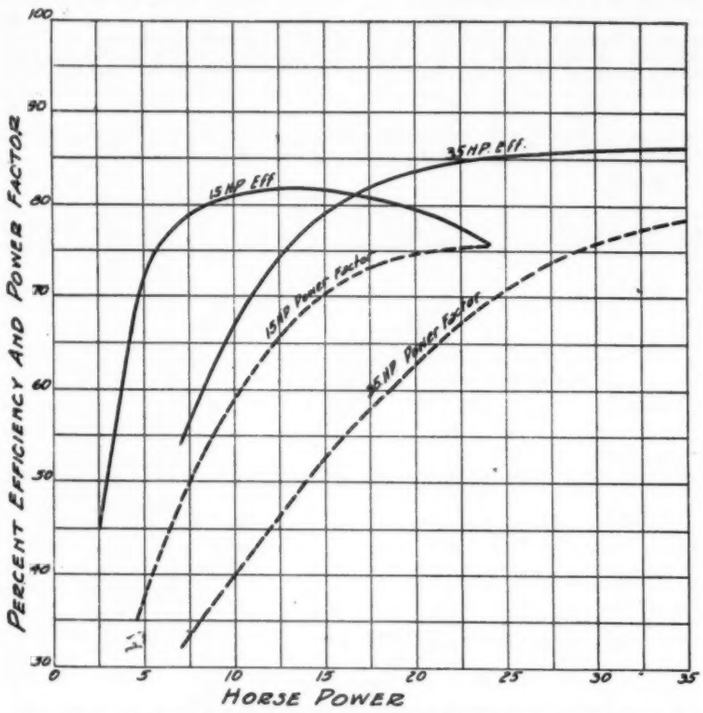


Fig. 3—Operating characteristics of 15/35 H.P. 600/1,200 r.p.m. slip ring type oil well pumping motor showing efficiency and power factor on the 15 H.P. 600 r.p.m. and 35 H.P. 1,200 r.p.m. connection

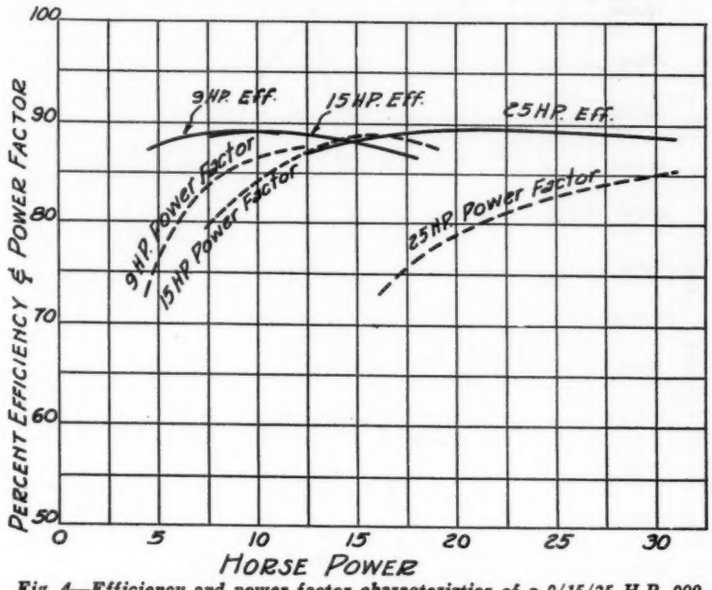
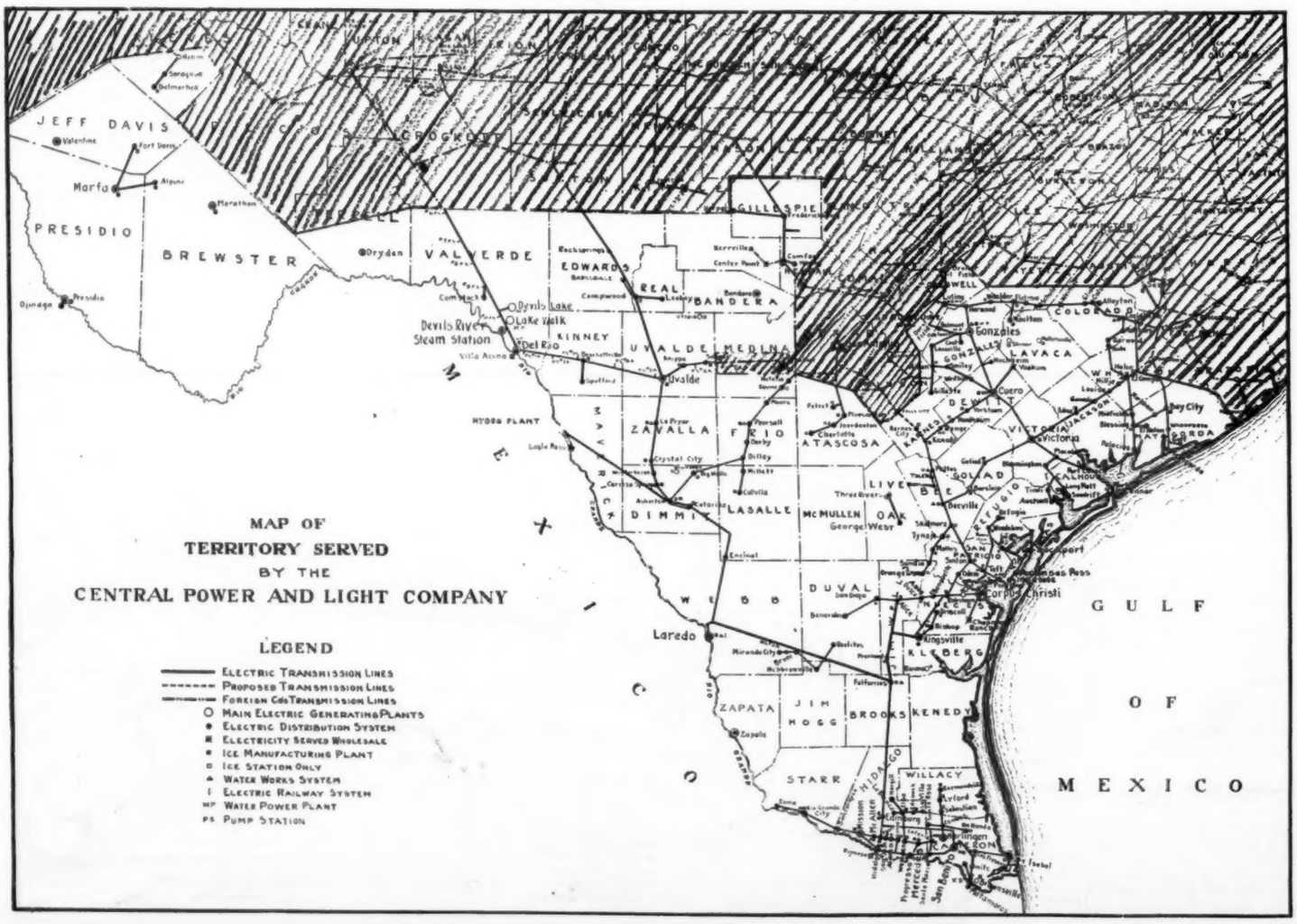
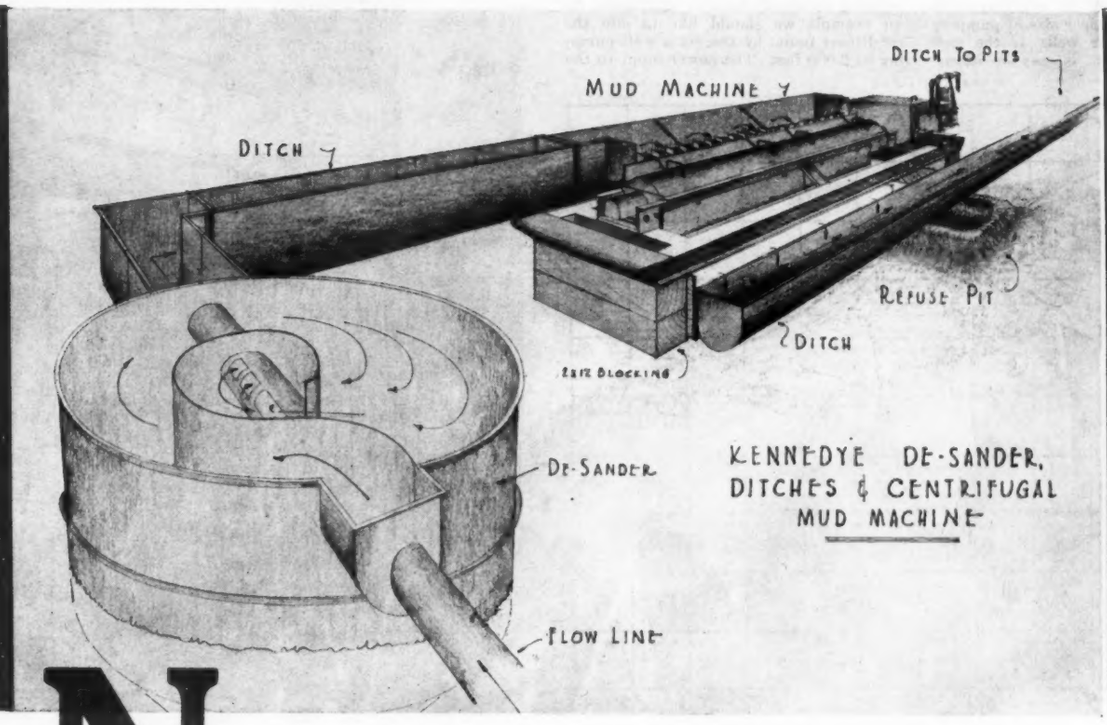


Fig. 4—Efficiency and power factor characteristics of a 9/15/25 H.P. 900 r.p.m. triple rated constant speed induction motor





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most important item in applying such units is to use the proper size of pumping unit for a particular well. If the unit installed is too small, it may be impossible to properly counterbalance or obtain the desired length of stroke without the introduction of stresses which would materially shorten the life of the unit. In the application of pumping units, care should also be exercised in selecting a unit that is not too large for the job, since considerable power would be wasted rotating needlessly massive equipment. As an example we should like to cite the conditions found by test on a well pumping at 2,000 feet. The power input to the motor was approximately 8.7 horsepower when using a pumping unit which was ample in size to take care of a 6,000-foot well. The heavy unit was disconnected and in its place was installed a complete light duty pumping unit, which when lifting the same total amount of fluid, required only 2.4 horsepower. While this may be an extreme case, it nevertheless is an indication of the power that may be wasted through the application of improper equipment.

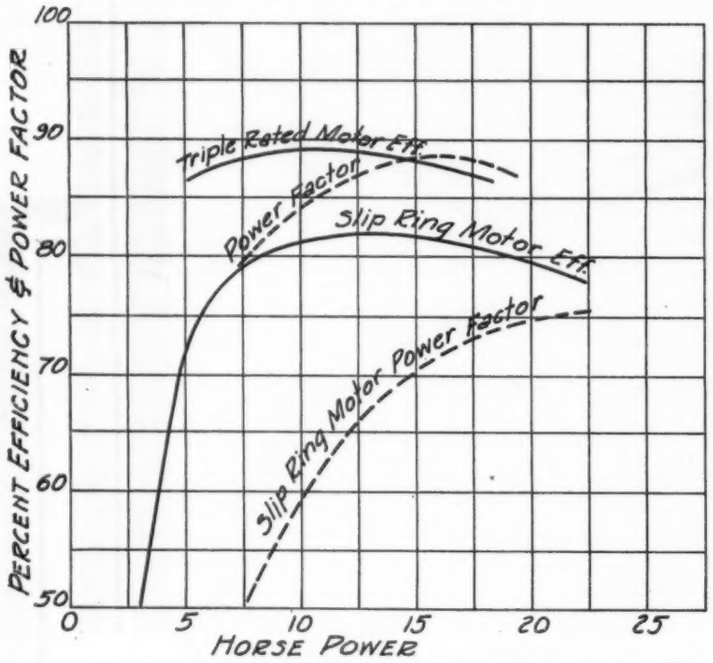

Fig. 5—Comparison of characteristics of triple rated motor on 15 H.P. connection and 15/35 slip ring motor on 15 H.P. connection

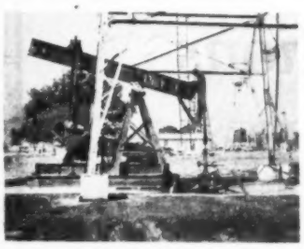

Fig. 6—Oil Well Supply Co. medium duty pumping unit with electric drive

A large number of pumping units in the Gulf Coast, including electric motors, are much too large for the wells on which they are installed. The reason for this is that units have been transferred from abandoned wells to new producers without regard to the needs of the new wells, and also, it has been only within the past few years that satisfactory light and medium duty pumping units have been available. A definite trend is noticeable toward the use of the proper size equipment to meet the individual well's pumping requirements. A great number of such installations have been made similar to those illustrated in Figures 6, 7 and 8.

Fig. 7—Parkersburg type SC-10 heavy duty pumping unit on a deep well

Fig. 8—Lufkin heavy duty single reduction unit with back side crank

An advantage in using one of the lighter electrically driven pumping units is that, when it is necessary to move a unit, the equipment is very nearly 100 per cent salvable. Any desired type or size of electric motor is available for use with these modern, self-contained, gear driven units; and, therefore, through the proper selection of pumping units and motors a very low cost per barrel of oil lifted may be achieved.

The Reda bottom hole pump has not as yet seen much service in the Gulf Coast region, but should warrant considerable attention from the oil operator, since tests conducted in other areas would indicate that it is admirably suited to handling large volumes of fluid which in general is the prevailing pumping condition in the Gulf Coast. This type of unit consists of a sealed pump and motor designed to be lowered below the standing fluid level in a well, from which point it pumps directly to the surface through the well tubing which also acts as the pump suspension agent.

Proper counterbalancing of pumping beam wells cannot be overemphasized. A good plan to follow is a system of checking the balance of each well at least once a month, and the most convenient way of doing this is the measurement of the motor input. As a general rule, satisfactory balance is considered to be indicated when the cyclic variation is reduced to a minimum. When using electrical recording instruments, the deflection of the indicator should be the same on both the up and down strokes. This is the condition of maximum pumping efficiency. Whereas, most companies usually conduct these systematic tests with their own electrical forces, any operator may avail himself of the services of his local electric company without cost.

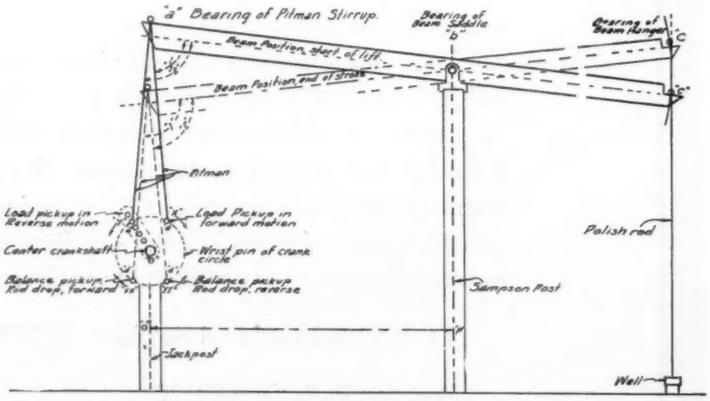

Fig. 9—Illustration of effect of forward and reverse crank rotation

The straightness of the hole and the condition of the subsurface equipment has considerable effect upon power requirements for pumping. Prior to the advances in the practice of drilling straight holes,

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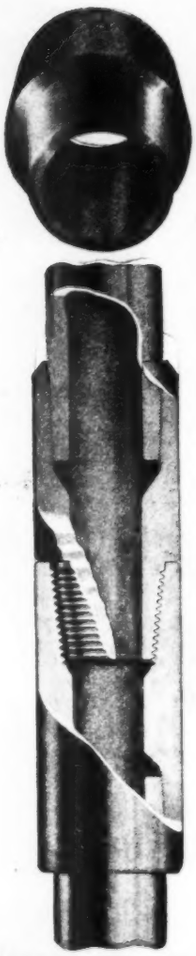
The latest designed Reed Rock Bit is of *unified construction — safest* for deep drilling. Roller bearing hard surfaced cutters give more hours of service on bottom — number of expensive round trips reduced.

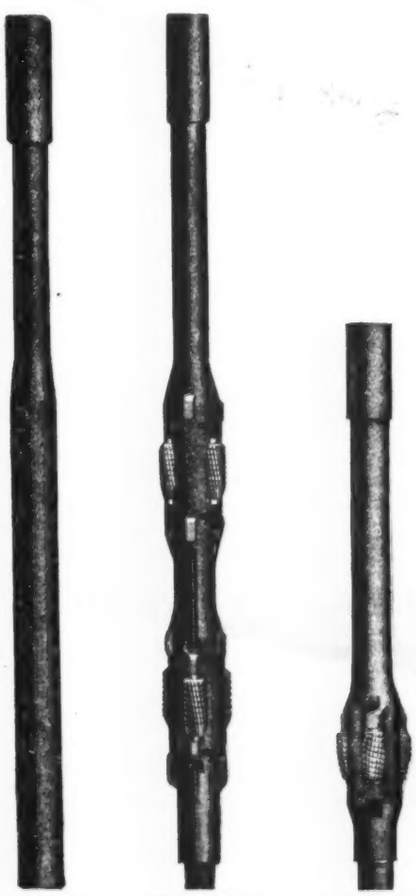
With the Reed B-R Drilling-Coring Tool, *cores are recovered* to the surface at any time while drilling, from any depth, *without removing the drill stem*. The core barrel is dropped thru the drill pipe and recovered with the core to the surface with a small wire line. Many round trips eliminated.

"It has been observed that most blowouts in Rotary Drilling occur when the drill pipe is being withdrawn from the hole." — A.P.I. paper No. 901-10D, April, 1934, by G. E. Cannon, Research Engineer, Humble Oil & Refining Co.

A core from every formation change — chances of passing valuable producing sands minimized. Over 50,000 successful cores with this tool to date is assurance of proven worth. Particularly adapted to deep drilling.



The *greatest improvement* in drill stems, especially for deep drilling is the Full Hole Tool Joint. Developed by Reed — adopted A.P.I. standard. Constrictions removed — circulation with long drill stems assured — pump pressures lowered — much hazard removed in deep drilling.



Reed Alloy Steel Drill Collars are safe and durable for deep drilling, because they are properly forged at the right forging temperature and *correctly heat treated* for body toughness and connection hardness.

The use of one-piece Reed Alloy Steel Heat Treated Reamers is the best assurance for *straight, full gaged holes* — of vital importance in deep drilling.

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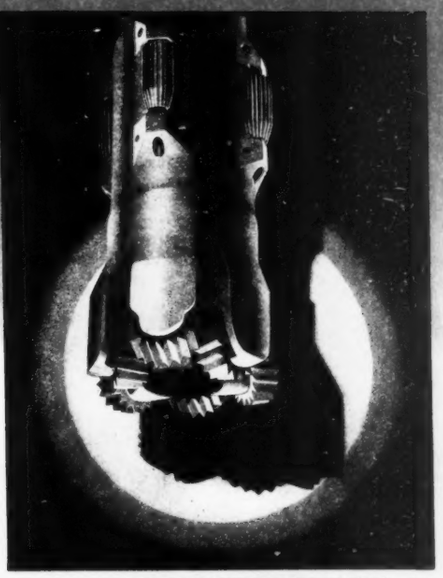
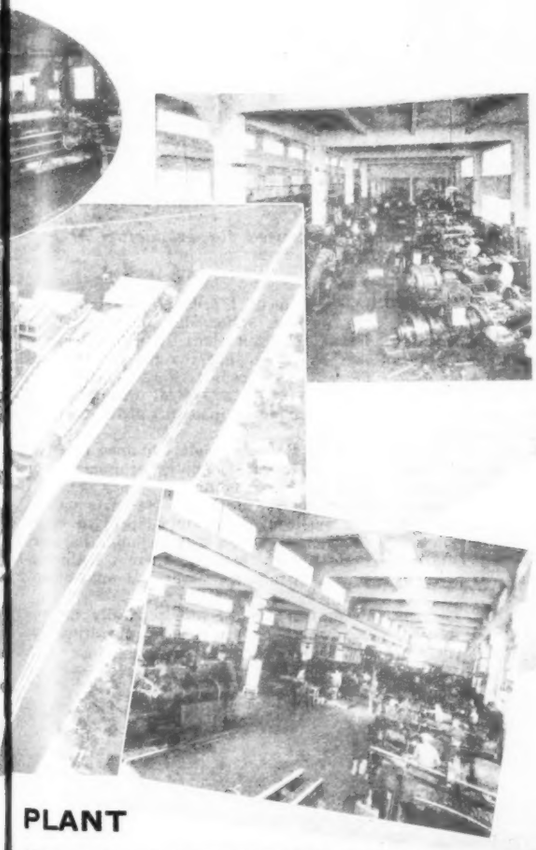
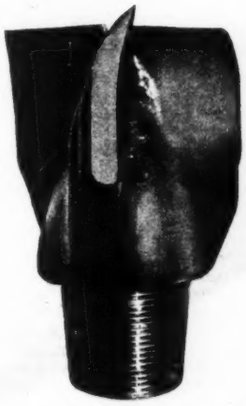
Heaving Shale enters the hole as the drill stem is withdrawn. Heaving shale has always been successfully drilled with this tool, when it is run on casing used for drill pipe, which casing is never withdrawn but instead landed and cemented below the heaving shale — the bit head with large bore is set as a casing shoe.

REED ROTARY DRILLING TOOLS



The improved Reed Model B Core Drill is designed for deep coring — cutter heads are unified — construction simplified for ***increased safety at greater depths*** — efficient cutter elements assure larger and longer cores with a higher percentage of core recovery.





The Reed Inserted Blade (welded in) Drilling Bit is a new development in fishtail or scratch type drilling bits. The blades are never rebuilt but instead replaced with new, hard surfaced, heat treated, drop forged, alloy steel blades — made with 2, 3 or 4 blades — a new bit for every run — unequalled records of speed and total footage now reported mean fewer of those costly round trips in deep drilling.

Reed Model B hard formation core drill with reamer (usual for larger sizes).

Reed Model B hard formation core drill without reamer (usual for smaller sizes).

Reed Model B soft formation core drill (soft formation cutter heads are interchangeable with hard formation cutter heads on the same core drill — likewise, the reamer can be inserted and run with either type of cutter head).

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it was found that in many wells there was considerable deviation from the vertical. When pumping equipment was installed, this resulted in excessive dragging of the sucker rods against the tubing, causing a reduction in overall pumping efficiency. Some holes have been known to be so crooked that sucker rods could not be used and it was necessary to go to some form of air or gas lift, in order to eliminate rod and tube maintenance.

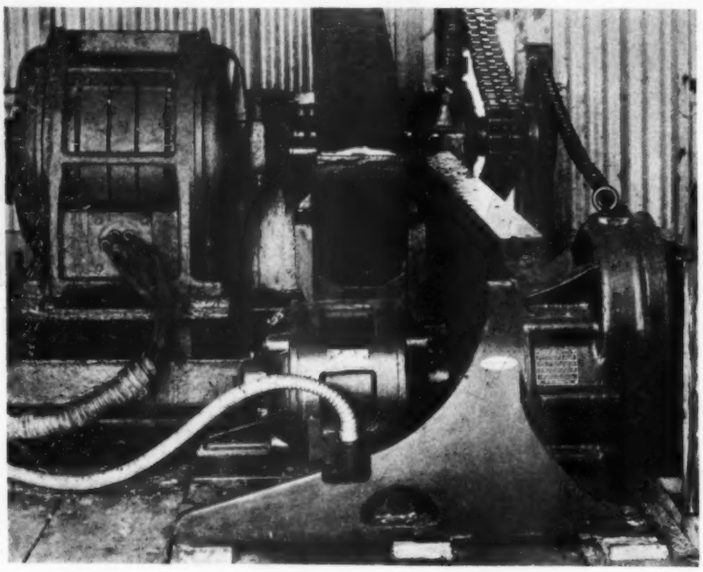


Fig. 10—5H.P. Louis Allis-Falk motor reducer driving a pumping unit at slow speed

It is frequently found that rotation of the pumping unit in one direction requires less power than in the opposite direction. The funamental reason for this characteristic is not generally understood. An examination of Figure 9 will serve to illustrate that the power required bears a relationship to the angle made by the pitman and walking beam at the instant the load is picked up. In general, if the pitman is longer than normal, less power will be required for operation in the reverse direction, but the easiest method to determine which direction of operation is best is by measuring the input to the electric motor for each case. In some cases the difference may be as much as 10 per cent; usually, however, the difference is only 1 to 2 per cent.

Where the individual well allowable can be obtained with less than 24-hour per day operation and well conditions will permit, it is possible to stagger the operation in order to reduce the electric power demand. This method of operation has been accomplished in a number of cases, automatically, by the use of time clocks which start and stop each well, or group of wells as the case may be, according to a definite predetermined plan.

The application of new types of efficient slow speed pumping units and improved types of pumps to both new and old wells has received considerable detailed attention. As a pumping well increases in age, it is probable that the amount of fluid and oil will change considerably, and it becomes necessary to alter the pumping conditions to suit the volume of fluid. A policy has been followed recently of using a long slow pumping stroke on heavy load pumping wells in order to reduce the power requirements of the well and at the same time reduce the maintenance on both the surface and subsurface pumping equipment. This trend developed under field proration when the allowable production was reduced on individual wells to such a point that it was only necessary to pump each well a few hours each day in order to produce the allowable.

As an example, one company was pumping wells a few hours per day at the rate of twenty-one 72-inch strokes per minute. The number of strokes was reduced 50 per cent without changing the length of stroke, thus requiring that the wells be pumped for a longer period each day. This practice resulted in the total power consumption decreasing approximately 45 per cent without change in production. It has also been determined on many full time pumping wells that the number of strokes per minute may be materially reduced without causing a proportionate decrease in production, but there is almost a proportionate reduction in the power requirements. In general, if the amount of fluid entering the well is limited to 60 bbls. per day or less, it has been found that the production can be obtained at the least cost per barrel by using a long, slow pumping stroke.

When a new well is pumped on the beam, it is not possible to determine how much fluid and oil will be produced, consequently a standard unit is generally installed that will pump several hundred barrels per day from the depth at which the well was completed. If only a few barrels of fluid per day are produced, it is probable that this type unit will prove to be inefficient. By installing a slow speed attachment and decreasing the pumping speed to from 3 to 10 strokes per minute, a great improvement in efficiency results due to the reduction in power dissipated in rig losses. To obtain slow speed pumping with conventional pumping units it is necessary to install a 5 to 7½-horsepower high speed induction motor and drive the pumping unit through a speed reducer. The motor and speed reducer may be a self-contained unit, such as the gear motor, or a standard high speed motor may be used with V-belt drive. In applying this type of equipment to a standard rig it is general practice to use a gear motor to drive the original motor through a chain and sprocket arrangement, the sprocket being installed on an extension of the large motor shaft. The large motor, therefore, serves as a countershaft for the small motor. During pumping operations the large motor is disconnected electrically and the small motor drives the pumping unit through the large motor. When well serviceing is required, the chain is removed from the small motor and the large motor is used in the ordinary manner. With gear type pumping unit, a chain sprocket or belt sheave can be installed on the shaft of the larger motor and a gear motor or V-type belt drive installed for the standard rig.

The cost of installing slow speed pumping equipment is relatively small, and the pay-out period due to savings effected, relatively short. Usually the savings are such that the investment will be retired in from 4 to 12 months.

Photograph of a typical installation of slow pumping equipment is shown in Figure 10.

Table 1 shows results obtained by converting standard pumping equipments to slow motion pumping.

Any of the methods of electric pumping outlined above are adapted to complete outdoor operation, eliminating the necessity for housing, thereby reducing initial installation costs and subsequent maintenance.

Quite a number of electrically driven bandwheel powers are in operation in

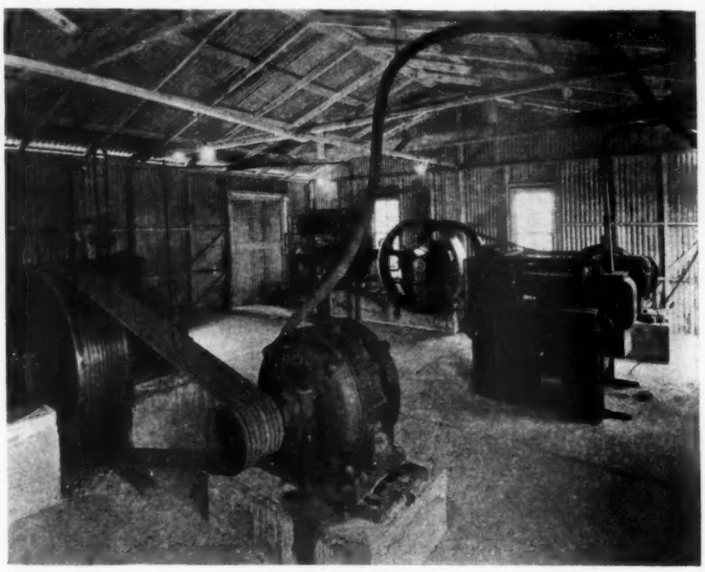


Fig. 12—Electrically driven gas compressors used for producing oil by gas lift

Fig. 11—Geared type power unit in the Humble oil field driven by a 15/35 H.P. slip ring motor

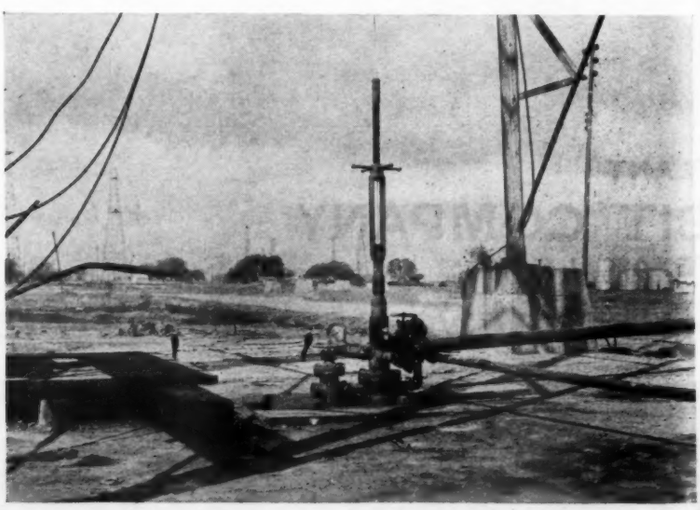


Fig. 13—Surface connections on a well producing by gas lift method

the Gulf Coast, and have rendered very satisfactory service. The modern trend in this type of pumping is the geared power, which like the geared pumping unit is efficient, long lived and suitable for use without housing in conjunction with weatherproof motors. Since the load on this type of pumping equipment is practically constant, the ordinary squirrel cage induction motor is satisfactory for normal use—or in any event, a star-delta motor is suitable where there is an anticipated increase in future load. A few slip-ring motors have been installed to drive powers of this type either where the motor happens to be on hand or where severe starting conditions were encountered, or to eliminate the use of a friction clutch. There is also one Fynn-Weichel motor installed on a power at Humble, Tex., which serves the double purpose of rotating the power and correcting lease power factor. As a general rule, however, the present trend is toward the more simple installation. Several ingenious methods are in use reducing the friction load of shackle line supports, the most efficient of which seems to be the swing type. The cost of installing the necessary number of swings has retarded the more general acceptance of this type of support. In a great majority of cases the support consists of grooved oak blocks, force fitted into short lengths of old tubing which have been driven into the ground and carefully aligned with a surveyor's instrument. Either type seems to produce a nominal friction load when properly maintained.

Old-style shackle lines which used to drag on the ground or were draped over trees, fences and other obstructions seem to have disappeared. The matter of balancing the bandwheel power to reduce the power consumption is accomplished in much the same manner as that described for balancing beam pumping wells, and is even more effective. The resulting saving in wear and tear on line and equipment makes the subject worthy of the operators' attention.

Figure 11 shows a typical geared bandwheel power installed in the Humble Field.

TABLE 1—SLOW SPEED PUMPING WITH SMALL MOTORS

Standard equipment before change					Slow speed pumping after change			
Pumping depth	Length stroke	Strokes per min.	Barrels prodn.	K.W. load	Length stroke	Strokes per min.	Barrels prodn.	K.W. load
3,735	48	27	50	13.1	33	11	50	3.5
2,735	60	22	45	6.9	24	13	60	3.7
2,150	27	25	47	5.8	27	8	47	1.3
3,100	36	22	40	4.5	36	8	40	1.6
2,837	30	26	26	3.9	30	9	26	1.2
1,910	27	30	40	5.9	27	12	40	1.2
2,523	37	25	12	4.3	37	6	20	1.3
2,840	31	24	34	4.0	38	6	33	1.8
3,825	29	28	42	6.4	44	13	36	2.8
2,485	30	24	60	4.6	37	8	60	1.2
2,625	26	28	36	7.0	42	8	36	3.0
2,925	30	26	20	11.0	45	7	20	1.2
2,320	35	21	64	4.7	28	13	69	1.8
2,275	30	25	45	4.8	38	8	42	1.0
4,400	32	21	15	7.3	32	11	15	3.2

While not a new process, gas and air lifts seem to be receiving renewed attention in this area, due in part to the introduction of several new lift devices which give an efficiency of operation much higher than that formerly possible, and quite a large number of wells have recently been taken off the beam and placed on lifts with a resulting increase in production. The gas and air lift method of pumping often results in prolonging the life of wells which are no longer practical to pump on the beam due to water encroachment.

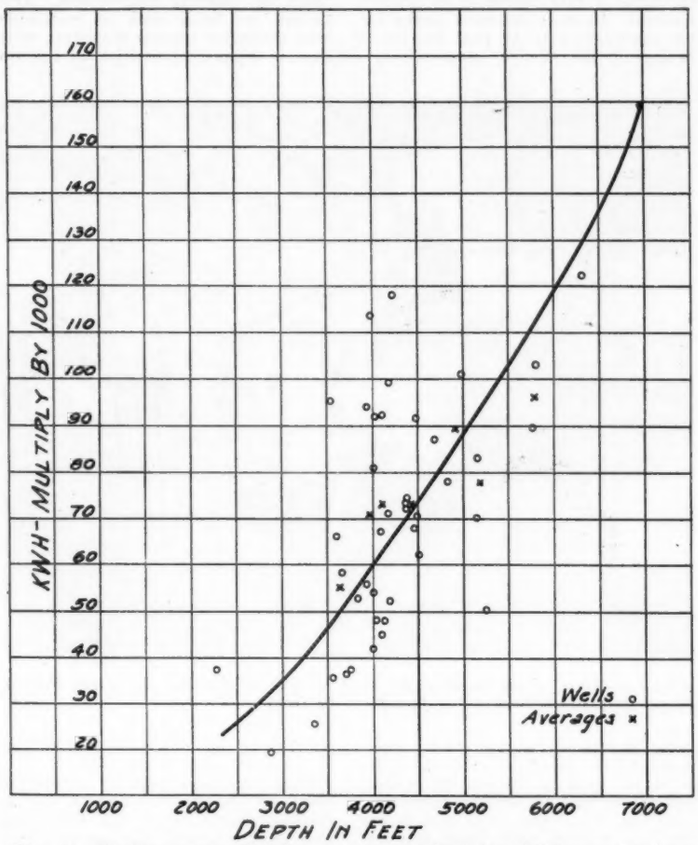


Fig. 14—Median curve showing energy required for drilling wells from 2,000 to 7,000 feet deep in Gulf Coast fields

Electrically driven compressor stations may be made automatic in operation and may be operated practically without attendance in a fool-proof manner. Compressors are equipped with from 50 to 100-horsepower squirrel cage motors. The whole installation requires very little foundation and housing and may be moved from lease to lease on short notice, and at very little cost.

Figure 12 shows electrically driven lift station at Barbers Hill. Figure 13 shows surface connections for a gas lift well.

Electric Drilling

Great advances have been made in drilling equipment during the past few years and 6,000 to 8,000-foot holes can now be completed easily and with dispatch. Electric drilling has kept pace with this advancement, having increased in size from 1-30/15 horsepower oil well motor connected through a single reduction gear to drawworks and 1-30/15 horsepower motor driving 4½x10 open type mud pump to the present Hild type drive of differential reduction gear powered by two 125/250 horsepower variable speed motors on drawworks, and one or two 7¼x16 mud pumps driven by 200-horsepower variable speed motors. Sometimes an auxiliary pump 6¾x12 is used in place of one of the 7¼x16 or larger pumps. The electric rig, therefore, has increased in power from 60 to 700 horsepower. Another type of electric drilling rig in the Gulf Coast employs the same setup on the mud pumps and uses a 200-horsepower variable speed motor driving the rotary and drawworks through a reduction gear. While such heavy duty rigs have been employed to a considerable extent in this area, most wells are being drilled with lighter equipment powered by 15-35, or 25-65-horsepower motors together with a 7¼x16 mud pump and 6¾x12 auxiliary pump. Such rigs are satisfactory on holes of 4,000 to 5,000 feet, and are capable of finishing a straight, clean hole at an average power cost of approximately 16 to 22 cents per foot, including setting and completing the well. In the Hull Field, 14 wells were drilled during the past year to an average depth of 4,440 feet with an average k.w.h. consumption of 39,214, or an average of 9 k.w.h. per foot.

Figure 14 shows a medium curve derived from the total electric power consumption required to drill a number of Gulf Coast wells to various depths.

Lighting drilling rigs for safe operation has also been receiving considerable study, and many Gulf Coast operators are now employing from 7½ to 10 k.w. per rig in lights. Some companies prefer the flood lighting method to the old plan of stringing lights in the derrick, and as a general rule those companies employing flood lighted derricks usually require the greatest electric lighting load.

Figure 15 shows a Gulf Coast electric rig set up at Pierce Junction. Figure 16 is a view of pump equipment.

The availability of electric power is decidedly an asset in the development of an oil field because of its great flexibility in performing innumerable production operations in addition to those of pumping and drilling. Wells in many of the Gulf Coast fields now being produced at a very low rate, may continue to flow for a number of years, and consequently the pumping load may be insignificant during this period. However, in many fields where there is no pumping load at present, there is still a large quantity of electric power used in the early stages of the development of the field, such as for the water supply system. It is general practice in the Gulf Coast to install deep well centrifugal pumps with vertical electric motors for pumping the water from the ground. The handling of water throughout the field is usually accomplished by using high speed centrifugal pumps with electric drive. The sizes of motors used on such installation range from one-half to 75 horsepower, depending upon the pumping head and volume of water to be handled. Salt water disposal is being successfully handled with conventional designs of electric powered centrifugal pumps. The principal advantage of this type of salt water disposal equipment is that it may be set up at remote points and operated continuously without the necessity of supervision.

Electricity for Shop Requirements

Almost without exception oil field machine shop equipment is electrically driven, since it provides a clean, noiseless, and instantly available source of power for all shop requirements. Perhaps the most universally used application of electric power in the oil fields is the dehydrator, such as shown in Figure 17. This form of dehydration has been successfully used in the Gulf Coast for many years, and it is conservative to say that more than 50 per cent of the total oil produced in this area has been electrically treated. The power consumption of such a device is so low that the cost of operation, from a power standpoint, seldom exceeds 12 to 20 cents per day, and in most instances is negligible as a lease operation cost factor. The dehydrator may be set up at small expense and may be moved quickly to points where such application is required.

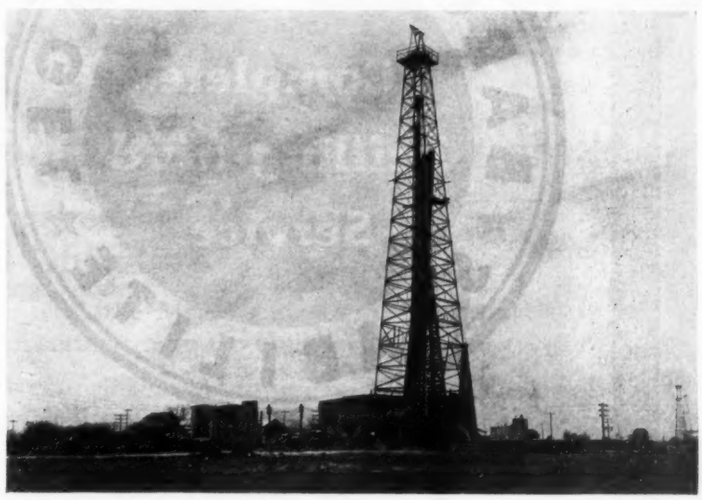
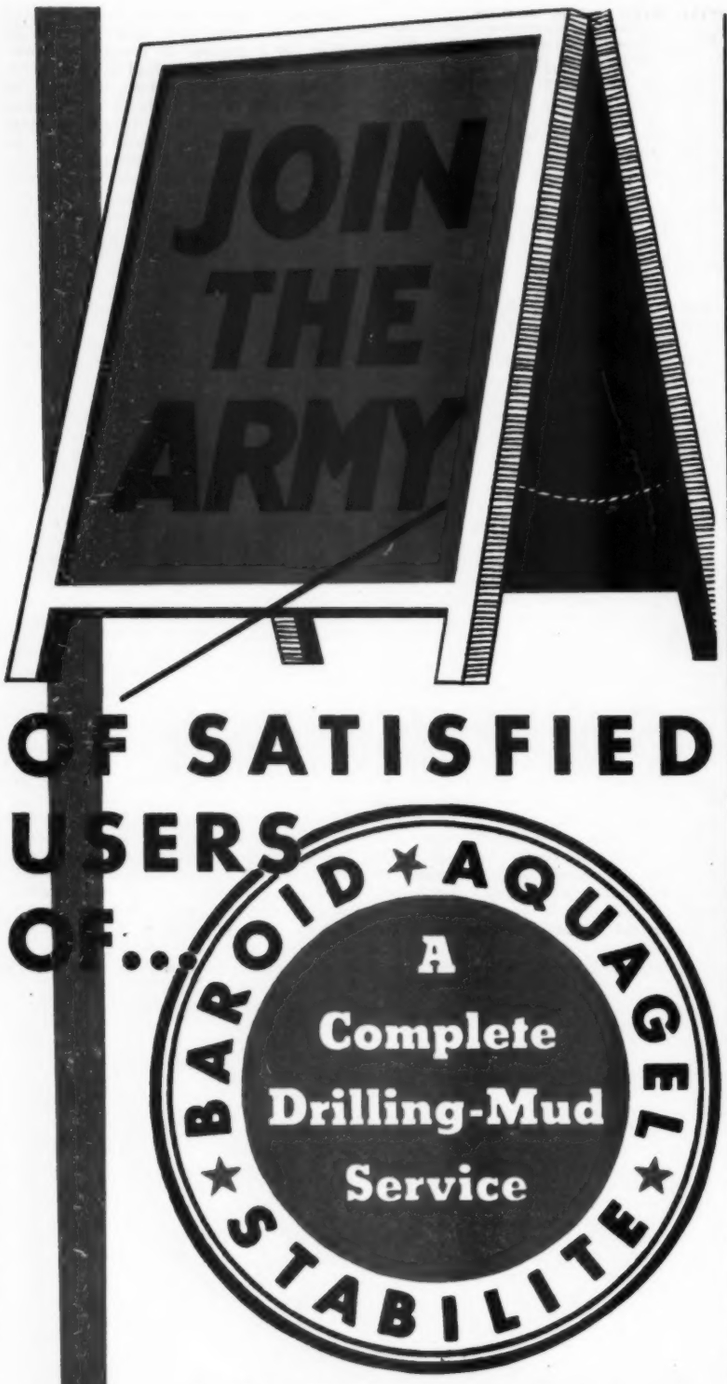


Fig. 15—Electric drilling rig in the Pierce Junction oil field

Most operators in this section have taken a keen interest in the safety of employes, and there is no question but that the greatest single aid in the promotion of safety work is the proper lighting of drilling rigs, pumping wells, tank batteries and other lease equipment. Flood lighting has come into such prominent use that in all but widely scattered operations, it is no longer necessary for pumpers, gaugers and other employes to go about their night work with the uncertain aid of a flashlight. Records definitely prove that the number of accidents occurring where operations are well lighted has shown a marked decline, and that the efficiency of operations has been brought to a new high. This is a natural development of the fact that the speed of human action is closely asso-



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ciated with the illumination level under which work is done. Considering the fact that most oil fields are generously endowed with a maze of criss-cross service piping, slush pits and other obstructions, and that work must be done at night on heavy moving machinery, which in many cases is not adapted to the usual forms of safe guarding devices, it can readily be appreciated that the subject of proper lighting will continue to receive the close attention of oil men and will improve rapidly as the fact becomes recognized that it is a source of dividends as well as a welfare measure.

The subject of power factor correction in connection with the application of electricity to oil field devices is of a technical nature, and it is not the writer's desire to go into any details concerning the proper application of this type of equipment. It is sufficient to point out the fact that most utilities are now offering bonuses for the correction of low power factor conditions, either in the form of rate offered or as a direct discount. In most instances power factor equipment may be paid for out of savings in the electric power bill in a period of from one to two years. Operators should consult their local utility as to the type of installation offering the greatest possibilities for power cost reduction. In general, it is safe to say that the present Gulf Coast trend is away from the central, or group corrective system, and is toward the installation of proper corrective equipment at the motor terminals. Power factor corrective equipment, in addition to the saving in power costs, permits the use of much smaller lines and transformers for any given load, and effects an improvement in voltage regulation.

There are two general ways of arriving at the number of horsepower purchased from a utility, namely, a connected load system based upon the manufacturers' name plate rating of apparatus installed and the actual measurement of the number of horsepower required. We should like to point out here that, when considering the measured demand system, the demand recorded is not the peak demand required, but instead is an average of the peak power requirements over a given interval, usually 15 to 30 minutes. For this reason it would be erroneous to assume that the number of horsepower paid for each month is a measure of the total horsepower required, since it is often found that the average requirements may be less than one-half of the peak horsepower requirements, and the customer, therefore, pays only on the smaller basis. In making any comparison between electric power and other forms of power, it is well to bear this fact in mind. This condition is made possible because of the fact that, so far as the individual consumer is concerned, the power supply available is practically unlimited; and because of the wide diversity of load on the utility system, it is possible for the utility company to give the consumer the benefit of this characteristic.

The general trend in the Gulf Coast area, when new equipment is required, is toward the use of all outdoor, weatherproof devices. Motors and control equipment are now available that are entirely satisfactory to install without any housing. The advantage of using this equipment is that the necessity for buildings or sheds is entirely eliminated; and the layout can be made simpler, more accessible, and less expensive.

Older Types Replaced

Single speed, multiple rated, squirrel cage motors are rapidly replacing the older types of oil field motors for all kinds of pumping applications. These motors are being used in conjunction with simplified systems of control, which provide adequate protection to the electrical equipment and which are not easily tampered with in the field.

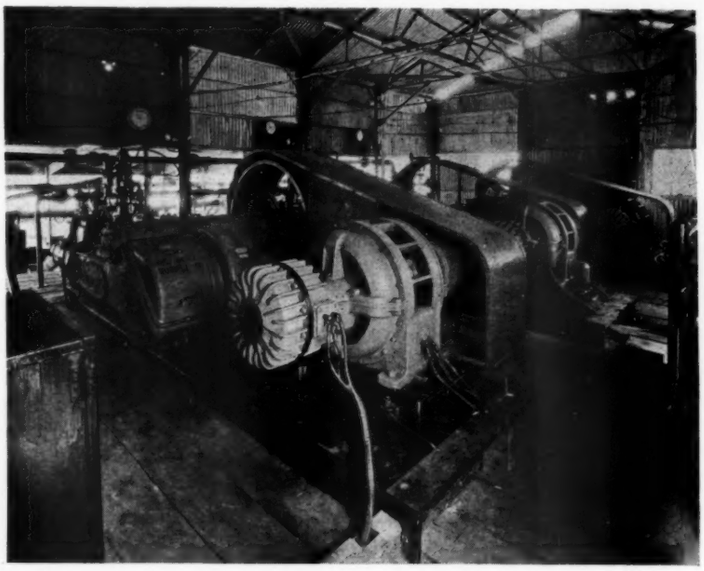

Fig. 16—View of the pump equipment on a Hild electric rig in the Pierce Junction oil field

During the past year, 80 per cent of the new pumping installations in the Houston district of the Gulf Coast were electrically equipped. The use of electric drilling rigs will undoubtedly be increased since lower rates for this class of service are becoming available and much more flexible, and higher speed drilling equipment is now on the market.

For shallow pumping service, various types of geared bandwheel powers are going in on the majority of electric installations, and more of this type of equipment will be sold when the economics of the units are realized. It is probable, however, that the majority of the Gulf Coast wells will continue to be pumped on the beam, since the major part of the investment in central power machinery must be made when only a few of the wells in a group necessitate being pumped. It does not seem feasible to make an initial investment in bandwheel equipment when a light reduction gear-driven motor unit will suffice and can be installed at a cost comparable to the individual well cost when pumping with central power. In addition, the individual unit will handle a large amount of fluid and is more flexible in that the number of pumping strokes may be adjusted to the requirements of each well. Gas and air lift methods are applicable to a relatively small number of wells under special conditions in the present state of development of this kind of equipment.

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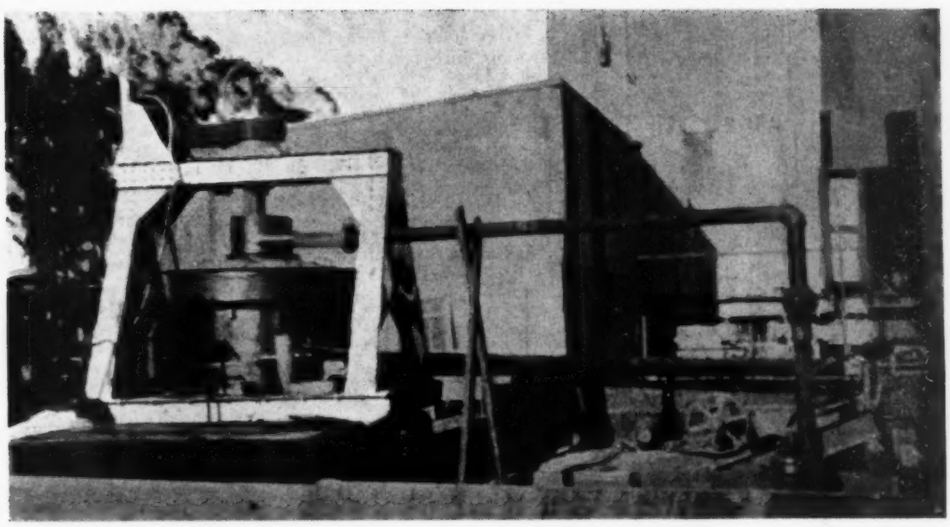

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Reduction of Production Corrosion Losses Due to Selection of Equipment

Results of Detailed Study

The rapid rate of corrosion which is sometimes experienced by equipment used in the production of oil has made it necessary to pay special attention to the problem. For the past several years a detailed study has been made of the subject in order to first, develop means by which the corrosivity of a well fluid could be accurately determined, and second, to evaluate the various materials which are offered as corrosion resistant equipment. Excepting within narrow bounds no means have been developed which make it possible to accurately determine the corrosivity of an oil field brine through analysis of the brine as produced. It is still necessary to initially equip each new well with the usual type of materials and wait for the corrosivity of the fluid to become manifest. Studies of corrosion resistant materials of equipment have been more successful. It is now possible to select equipment which can be used to reduce the production cost under that experienced when non-corrosion resistant equipment is used.

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The production of oil together with the accompanying gas and brine oftentimes results in rapid corrosion of the equipment used. The added production cost, resulting from handling severely corrosive fluids, has made it necessary to study the causes of oil field corrosion in order to predetermine the corrosive action of the fluid handled, and to develop methods for reducing losses in case they occur. As yet, very little success has been accomplished in predetermining the corrosivity of any given oil field brine, excepting in the case where hydrogen sulphide is present. More success has been obtained in developing satisfactory materials for use with corrosive brines.

Predetermining Corrosivity

It is customary in judging the probable corrosive action of the fluid from a new field to make the decision upon the presence of hydrogen sulphide gas. If

Fig. 1—Black liner after 23 months' service

this gas is produced along with the fluid it is well to expect a high corrosion rate. As a normal condition surface equipment is more subject to rapid attack from hydrogen sulphide than is the subsurface equipment. This is primarily due to the fact that the fluid, as produced, is free from oxygen, and the absence of this element prevents the fluid from attaining its maximum rate of corrosion. Oxygen first enters the production system through the gunbarrel or lease tank. This, and the subsequent equipment such as salt water disposal lines, the pipe line gathering system, etc., are usually rapidly attacked[1].

Some sulphide fluids are corrosive to the subsurface equipment and some are not. As long as the water/oil ratio is comparatively low almost complete freedom from corrosion may be obtained. As the water/oil ratio increases the resulting corrosion rate is dependent both upon the quantity of paraffin which develops on the equipment and the composition of the brine. The exact relationships governing the rate of hydrogen sulphide corrosion upon subsurface equipment are dependent upon the oxygen content of the fluid, the protective influence of paraffin, and the water/oil ratio, and the exact brine composition. These variables make it difficult to predetermine the exact corrosivity of the fluid produced. To date, the only fairly reliable guide is obtained through a knowledge of the total fluid produced and of the presence of paraffin. If a well produces a small quantity of sulphide-bearing fluid daily, i.e., less than 100 bbls., at a fairly high water/oil ratio, i.e., greater than 3 to 1, and the oil is free from paraffin, then subsurface corrosion is usually obtained. The major fields of today which produce hydrogen sulphide-bearing fluid at the rate of 500 to 1,000 bbls. of fluid, daily, under high water/oil ratios, are experiencing a surprising freedom from corrosion.

Non-hydrogen Sulphide Fluids

Fields which produce fluid free of hydrogen sulphide gas are much more difficult to catalogue with respect to corrosion attack than are those which contain this gas. A few general rules again may be used as a basis for anticipating the probable corrosive action of the fluid produced. As long as a well produces at a low water/oil ratio there is little likelihood that corrosion attack will occur. There is no exact water/oil ratio which may be used as a dividing line because some wells produce at a rate as high as 50 bbls. of water to 1 bbl. of oil, and never give serious corrosion troubles, while others are severely corrosive at water/oil ratios much lower than this. Few, if any, wells show serious corrosion attack if the water/oil ratio is less than 3 : 1. When the water/oil ratio rises above 3 : 1 the resulting corrosion rate depends largely upon the presence of paraffin and apparently the exact composition of the brine. It is only to be hoped that future production from new pools will be obtained at a low

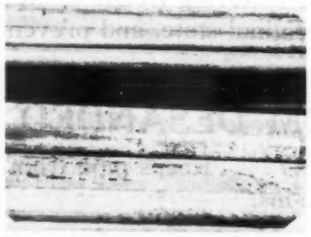


Fig. 2—Galvanized and black liner after 23 months' service

water/oil ratio and hence, with an almost certainty of freedom from corrosion attack.

Corrosion Resistant Equipment

In order to combat the severe corrosion which is frequently encountered from both sulphide-bearing and sulphide-free brines a great many tests of coatings and materials of construction have been conducted during the past several years. It is the purpose of this paper to outline the causes of the principal types of equipment corrosion failures and to present the more successful materials which have been found to aid in reducing these losses.

Strainer

In wells producing from soft sandy formations a strainer is necessary to prevent more sand than can be handled from entering the well. It is essential that this item of the well equipment be kept in good condition, because well workover jobs, caused by corroded or sand cut strainers are expensive, and may materially effect the production of

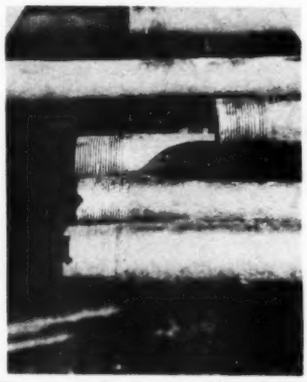


Fig. 3—Joint end tubing failure from corrosion through threads from pipe interior

the well. Corrosive non-hydrogen sulphide-bearing fluids cause large holes to develop in the strainer with the result that formation sand enters the hole and stops further production, therefore, it is essential that the strainer be constructed of corrosion resistant material. Strainer design may roughly be divided into two classes, the button class and the wire wrapped class. The button type of strainer is usually composed of brass or bronze buttons pressed into steel pipe. In corrosive fluids galvanic action may result from the contact between the two metals. This action is sometimes sufficiently severe that the bimetal contact is corroded away. When this occurs the soft sands of the producing horizon may enter the well bore and stop production. Wire wrapped strainer may be subject to the same type of failure if it is composed of dissimilar metals. It is often the case that bronze or brass wire is used to wrap over steel pipe. If a strainer of this design is used in a well producing corrosive fluid it may fail through galvanic action between the wire and the pipe. When this happens the well sands up and must be reworked.

Where the well produces hydrogen sulphide-bearing fluid the screen may become clogged and neither sand nor fluid can enter the well. This clogging action usually occurs when a brass or bronze wire wrapped strainer is used and the daily fluid production is low. Under these conditions, sediment from the producing formation becomes embedded in the copper sulphide on the screen face to form an almost impervious layer over the strainer. It sometimes happens, however, that the installation of a corrosion resistant strainer will not solve this problem. This is due to the continued blanketing effect of the formation sand and iron sulphide particles which come from the steel liner or tubing above the strainer. When this happens the failure cannot be charged directly to the strainer although the effect is the same for the well production declines. It becomes necessary to experiment with changes in the operating conditions of the well to prevent the settled particles from stopping the fluid flow.

Where severe corrosion is experienced there are two types of corrosion resistant strainers which may be used. One of these is composed of nickel wire wrapped over nickel pipe. This type of construction can be used with either non-sulphide or sulphide-bearing brines with almost certainty of freedom from corrosion attack. Unfortunately, the cost of the strainer is rather high and this prevents its more general use. The other of these is composed of galvanic wire wrapped over galvanized pipe. This type of strainer can also be used under either sulphide or non-sulphide conditions. Its corrosion resistance is not quite equal to that of the nickel construction but its lower cost makes it a very satisfactory material to use under certain conditions.

Fortunately, most wells produce non-corrosive fluids. In these cases the usual strainer setting is composed of galvanized, brass or bronze wire wrapped over black steel pipe. There are today a good many hundred wells which are producing through strainers of these types without any corrosion difficulty. Due to the impossibility of predetermining the corrosivity of oil well brines the first strainer setting is usually of this type and unless excessive corrosion develops satisfactory service will be obtained.

Fig. 4—"Ring worm" corrosion failure of external upset steel tubing

Strainer failures of all sorts take place which are not caused by corrosion. For instance, as mentioned, the exterior face of the strainer may become clogged with accumulations from the producing horizon, the strainer may become sand cut through the use of improper mesh, or producing the well at too high rate of flow, or the strainer may become clogged with drilling mud while making the set-

[1] U. S. Bureau of Mines, R. I. 3160. The Effect of Oxygen on Gaseous Hydrogen Sulphide Corrosion of Tank Steel. Devine, Wilhelm and Schmidt.

ting. These difficulties are so important that the next advances in strainer need not to be along the line of added corrosion resistance, but rather along the line of improved strainer design.

Liner

Liner may be construed as either of two types of well settings. In regions where strainer is used the liner string may consist of a full string of pipe extending from the top of the hole to the top of the strainer. In regions where perforated pipe is used the liner consists of a few joints of blank pipe extending above the perforated pipe.

Fig. 5—Failure of plain end galvanized tubing from corrosion and rod wear through threads

Where the latter type of setting is made the producing horizon is usually consolidated material, and it does not make a great deal of difference whether the liner corrodes or not. The most serious trouble in wells of this sort occurs when the fluid produced is supersaturated with calcium and magnesium bicarbonates. In these cases gyp deposits form over the pipe perforations and make it necessary to rip the liner open, or clean out with acid.

Where a complete string of pipe is run from the top to the bottom of the hole severe corrosion is sometimes encountered. Figure 1 shows a string of 4½-inch liner removed from a well after 23 months' service. In cases such as this the strainer is also usually corroded, unless it is constructed of special material.

It has been found through experimentation that the necessary added corrosion resistant for liner strings is best obtained through the use of galvanized pipe. Figure 2 shows two joints of liner pulled from the same well after the same period of service. The black pipe was badly corroded and taken from the hole with difficulty; the galvanized portion of the liner was in relatively good condition. There were several pits almost through the wall of the galvanized pipe but no actual penetration had occurred, and not more than 5 per cent of the total galvanized surface was affected.

Tubing

The high cost of a string of tubing has caused a great deal of attention to be focused on the service given by this item of well equipment[2]. The life of a string of oil well tubing may be determined by either mechanical or corrosion forces. Excessive mechanical forces in a well are manifest when the tubing develops cases of broken threads, split joints, rod wear failures, etc. Excessive corrosion forces are manifest through the development of leaky collars from thread corrosion, split joints from corrosion of the tubing or back of the tubing threads, etc.

For several years detailed records have been kept of all tubing failures from a number of fields. Analysis of these data have shown that the failures which occurred appeared most significant when divided into joint end failures and body failures. It was found that joint end failures constitute between 50 and 75 per cent of all tubing failures. These joint end failures are composed of:

1. Thread breaks.
2. Corrosion through threads from inside of tubing.
3. Rod wear through threads.

Figure 3 is an instance of tubing replacements caused by corrosion through the threads from inside the tubing. These joint end failures are developed by both mechanical and corrosion forces. Since they constitute a major portion of all tubing failures it is obvious that corrective measures should be used to reduce them. The remedy for joint end failures has been obtained through the use of external upset tubing. This type of tubing is designed to be as strong in the threaded portion of the tubing as in the tubing body. This increased strength at the joint end results in fewer thread failures; and the increased wall thickness increases the tubing service before it is corroded or rod worn through. The service which has been given by a number of external upset tubing installations has fully justified its selection.

Although the use of external upset tubing has reduced the number of joint end failures previously experienced, this type of tubing was found to be subject to accelerated corrosion attack in the upset zone. This localized or "ring worm" attack is shown in Figure 4. It has since been found that if the external upset tubing is fully normalized this localized attack does not occur.

Body failures constitute the other 25 to 50 per cent of all tubing failures.

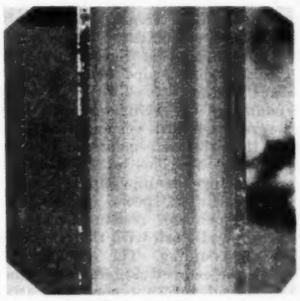


Fig. 6 — Polished interior of new working barrel

Body failures are divided into two main classes, split joints and corrosion holes. Split joints, or more properly, split welds, are largely the result of using lap welded tubing. The use of seamless tubing will almost entirely eliminate this form of trouble. A reduction in the number of corrosion holes through the tubing body as well as a reduction of joint end failures by corrosion through the threaded ends can only be accomplished through the use of corrosion resistant tubing. Extensive tests are under way to determine the relative corrosion resistance of the various ferrous materials suitable for oil well tubing. These include:

1. Plain carbon steel.
2. Wrought iron.
3. Electric furnace iron.
4. Copper bearing steel.
5. Copper-molybdenum steel.

Until such time as test strings of these materials develop data to the contrary plain carbon steel is used for tubing construction. Using this material as the base metal and incorporating into the tubing the various means which have been discussed for reducing joint end and body failures it appears that the best type of tubing to use is plain carbon, fully normalized, external upset seamless steel.

There are frequent cases of wells which produce fluid of such high corrosivity that the use of black tubing is not satisfactory and a protective coating is desired. Almost the only type of protective coating which can be used for tubing is a galvanized surface. If plain end galvanized tubing is used it has been found that little additional life over that of black tubing is obtained because of the rapid loss of the galvanized coating from back of the tubing threads. Figure 5 shows a complete galvanized string failure because of rapid corrosion attack and rod wear back of the threads. It is believed that a satisfactory increase of tubing life will be obtained if external upset galvanized tubing is used.

Working Barrels and Balls and Seats

While working barrels and balls and seats are among the least expensive of the various items of oil well subsurface equipment, they are used in the remote portions of the well where failure results in relatively costly labor charges for pulling and replacing them. This is particularly true for working barrels as the condition of the barrel not only determines its own life, but has a more important bearing on the life of the cups used on the traveling valve. It has recently been shown that for a typical Gulf Coast Field replacement of working barrels, cups and valves constituted 52.7 per cent of the cost of keeping the wells in pumping condition.[3] Of this the cup life as influenced by the condition of the working barrel played an important part. Data were given to show that the ratio of the service given by the first set of cups to the average service varied from 1.13 to 4.64. Where ratios in the neighborhood of 4.64 are obtained, it is obvious that the surface of the working barrel has changed to an unsatisfactory condition.

Most all working barrels are composed of cold drawn steel tubing of special size. They are given polishing passes and possess a smooth interior. It is advisable that the interior of the working barrel be kept in this smooth polished condition as long as possible while in the well. Figures 6 and 7 show the difference in appearance of the smooth interior of a new working barrel and the roughened interior of one taken from a well after about 90 days service. It is obvious that the used barrel has developed a surface that would prevent the traveling valve cups from giving the same life as obtained when the barrel surface was new and smooth.

Balls and seats are an item of pump equipment which may give severe trouble in certain fields. Fortunately, most fields

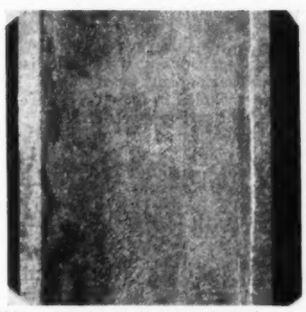


Fig. 7 — Roughened interior of used working barrel

do not give such trouble with this equipment and replacement costs are within reason. In certain sulphide bearing fields balls and seats of all compositions crack open in a short time ranging from 24 hours to 30 days. In fields of this type a certain amount of relief has been obtained through the use of special drops and seats.

In general, the minimum ball and seat expense seems to be obtained through the use of the better alloy balls and seats and through regrinding the replaced ones for further use.

Sucker Rods

The majority of sucker rod failures have been shown by Wescott[4] and associates to be due to metal fatigue or a combination of corrosion and fatigue. The fatigue properties of a metal are those properties which allow that metal to resist failure when subject to fluctuating stresses. Each metal has a different value of fatigue resistance depending upon the shape and finish of the metal and the conditions under which it is used. The minimum fatigue resistance is usually obtained when the metal has an uneven surface and is used in a corrosive medium. The effect of an uneven surface such as tool marks, sharp changes in structure, deep cut threads, etc., is to increase the stress concentration at the point of change in cross section of the metal. Under the condition of a fluctuating load this stress concentration may be sufficient to start a small crack which will grow to failure with continued application of the load. The effect of corrosion may be to start small pits in an otherwise smooth surface and which in turn will develop this same type of failure. These fatigue failures are characterized

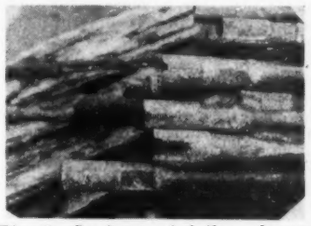


Fig. 8—Sucker rod failure from coupling wear

by direct breakage across the rod section and without the necking down which is characteristic of tension failures.

Fatigue failures are particularly associated with high values of momentary stress. When rods are used to pump at long, fast strokes, i.e., a 72-inch stroke at 28 to 30 S.P.M. with a 2¼ or 3-inch working barrel in wells 3,000 or more feet in depth the momentary impulse loads which are developed are often of sufficient value to cause fatigue failure in a short length of time. If the well fluid is of the corrosive type the development of failures may be accelerated.

The minority of sucker rod failures are due to embrittlement, corrosion or excessive wear. Sucker rods used in wells producing hydrogen sulphide bearing fluid may become subject to embrittlement failures not associated with fatigue failures. In these cases it appears that nascent hydrogen liberated by the reaction of hydrogen sulphide with the sucker rod iron penetrates the intercrystalline structure of the metal with a resulting loss of ductility and strength. Cases of embrittled five-eights inch sucker rods have been encountered where the rods could be broken by hand. Fortunately, this type of trouble is not extensive.

In a very few highly corrosive fields the dominant cause of sucker rod failures is through corrosion attack. In these fields the rods are corroded until the yield point of the remaining metal is exceeded

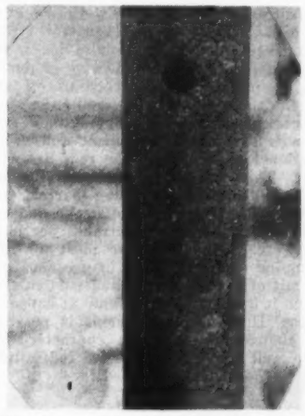


Fig. 9 — Corrosion penetration of asphalt lined pipe in 57 days

and failure occurs. The number of failures from this cause, however, is but a small portion of the total.

Another type of rod failure results through wear of the rod, or rod coupling on the tubing walls. Figure 8 is an example of this sort. In some fields rapid wear occurs in a short time with the result that the rods fail through increased unit load. In other fields wear takes

[2]"Corrosion of Oil Well Tubing," Rogers, mid-year meeting, A.P.I., May, 1933.

[3]W. F. Rogers, Special Alloys for Working Barrels and Balls and Seats. Fourteenth Annual Meeting A.P.I., 1933.

[4]Pet. Engineer, Vol. 2, No. 7, p. 74; Vol. 2, No. 8, p. 86; Vol. 2, No. 13, p. 52; Vol. 3, No. 2, p. 26.

place slowly and over a period of years. In the older fields where the production has declined to a low figure, rod replacements from this cause are often a major portion of the lifting cost. Some attempts have been made to show that rod wear is a function of the tubing and rod materials of construction. This is probably true to some extent but, in addition to this cause, there are others of importance such as rapid rates of pumping, crooked holes, lubricating effect of the oil produced, etc.

The practical method of reducing sucker rod failures is to determine for each field the most satisfactory rod to use. Sucker rods may be obtained of various physical properties depending upon their chemical composition. Their physical properties range from the low tensile strength of plain carbon and wrought iron rods to the maximum strength of high manganese rods. Each of these rods has some advantage over the other and which is manifest only under favorable operating conditions. It is advisable to set in each field one or two mixed strings of the various rods and follow their service.

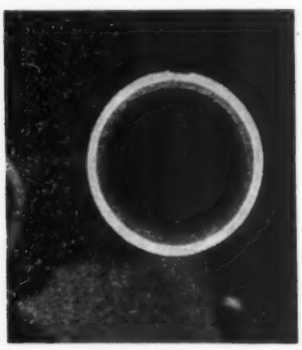


Fig. 10 — Cement lined pipe after 257 days of test

It is of extreme importance that the rods be alternated in position in the well string and be tested at the same time. This competition under identical conditions enables a direct comparison of service to be obtained. The service given by the various rods can be balanced against their cost and the most satisfactory rod purchased. This method of selecting sucker rods has the advantage that it entails practically no additional cost over regular field operations. It is only necessary to keep an accurate record of the number and type of failures so that the proper selection can be made.

If it is felt that the best type of rods are already being purchased but that the number of failures are still excessive, the operating condition of the wells should be studied. It has already been stated that the large momentary impulse loads due to long strokes and rapid rates of pumping are particularly conducive to rod failures. As a consequence, one of the most successful methods for reducing these failures is to reduce the impact and acceleration loads to which the rods are subject. This can be done through the use of small diameter working barrels, increasing the length of the stroke and decreasing the number of strokes per minute, etc. Unfortunately, most of the pumping equipment now in use does not permit of ready changes and particularly when it is being used to pump at capacity rates. However, wherever it is possible to change the pumping characteristics of a well subject to excessive rod failure the method should be tried.

Polish Rods

The common cold drawn polish rod will give an entirely adequate life on the majority of wells. On a few wells the polish rods are subject to rapid pitting and consequent troubles with keeping the stuffing box properly packed. In most of these latter cases it is more economical to replace the rod with a new steel one than to use a special alloy rod as the low cost of the steel rods makes it difficult to use generally the corrosion resistant, but costly rods. If a corrosion resistant rod is desired, successful use can be obtained from any of a number of stainless or bronze materials now on the market.

Lead Lines and Salt Water Disposal Lines

As a normal condition lead lines used to carry the fluid from the well head to the gunbarrel are not subject to corrosion attack. There have, however, been a few exceptions to this rule when hydrogen sulphide bearing oils were handled. The greatest corrosion difficulties are usually encountered in disposing of salt brine and in handling sulphide bearing crude oils from the stock tank to the pipe line station. In most of the older fields salt water disposal has been accomplished by freeing the water at the gunbarrel and allowing the brine to follow drainage courses to the nearest creek. In the more modern fields salt water disposal is handled through a planned system, and in these cases care must be taken that the proper corrosion resistant material is used.

In fields where sulphide bearing fluids are handled a very rapid corrosion rate is obtained in both the salt water disposal lines and in the pipe line gathering system. It is for fields of this type that unusual care must be taken in selecting the equipment for handling both the salt water and the oil. The rapid corrosion rate experienced with the salt water lines is largely due to the small amount of air which combines with the brine before it passes to the disposal system. The rapid corrosion rate of the pipe line oil gathering system is due to the small amount of brine and its accompanying air which is carried over into the pipe line system when the oil is pumped from the lease tanks. It has been determined through experimental means that the normal oil velocity in a pipe line gathering system will not clean settled water from the pipe bottom. This allows the sulphide bearing brine to remain on the pipe bottom undisturbed by the oil movement with the result that the pipe may be penetrated in four years time or less.

In order to obtain a corrosion resistant material which could safely be used for services of this type several extensive tests of various ferrous materials both black and galvanized were installed in sulphide bearing salt water lines. The materials included in these tests were:

1. Plain carbon steel, black.
2. Plain carbon 25 per cent C.B. steel, galvanized.
3. Plain carbon 1 per cent C.B. steel, black.
4. Plain carbon 1 per cent C.B. steel, galvanized.
5. Toncan steel.
6. Wrought iron, black
7. Wrought iron, galvanized.
8. Asphalt lined steel.
9. Cement lined steel.
10. Cement lined wrought iron.

Beginning with 59 days of test the ferrous materials began to fail. To date after more than 750 days of trial all of the test specimens excepting cement lined wrought iron and cement lined steel have failed. The cement lined materials are still in first class condition and promise to give an indefinite life. The protection which this lining has given establishes it as an unusually good protective coating. The strength of the lining has been well established in pipe sizes up to and including 6-inch. Cement lined pipe in these sizes has been successfully handled in oil field practice without breaking or otherwise damaging the lining material. The thickness of the cement lining is variable depending upon the pipe size

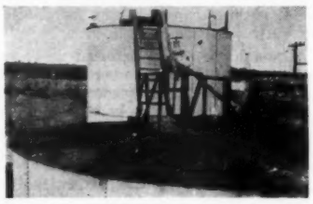


Fig. 11 — Steel lease tank deck after 20 months' service with sulphide oil

but is of sufficient value that the decreased pipe diameter must be taken into account when calculating flow capacities.

It is essential that the coupling used with cement lined pipe be as corrosion resistant as the pipe. Two types of special couplings are being offered for use with screw coupled cement lined pipe. One of these has a cement ring between the threaded portions of the coupling. Before making the pipe up the threads are coated with a special cement which acts as a corrosion resistant seal. The pipe is screwed flush with the cement lining of the coupling. The pipe end contact with the cement ring and the cement on the threads prevent corrosion attack of the coupling. The other of these is a coupling constructed with a lead ring cast in the coupling center and tapering outwards from the center so that the last two of the coupling threads are cut in the lead. When this coupling is used the pipe is screwed up until it butts against the lead ring. The soft lead allows for a tight fit against the cement of the pipe and prevents access of the corrosive fluid to the iron.

Cement lined pipe promises to be a very versatile material for it can be used for a number of purposes. Among these are:

1. Salt water lines.
2. Fresh water lines.
3. Oil lines handling sulphide bearing oils.
4. Tubing for key wells on repressuring projects.
5. Gas lines, etc.

Figure 9 shows the penetration which occurred to asphalt lined pipe after 57 days. Figure 10 is of cement lined pipe after 257 days in the same test with no evidence of corrosion attack.

Lease Tanks

In fields where hydrogen sulphide gas is produced along with the well fluid the rate of corrosion of steel tanks is extremely high. As pointed out previously this is largely due to the accelerating influence of oxygen on hydrogen sulphide corrosion and the fact that this element first enters the production system through the gunbarrel or lease tank. The normal life of a steel lease tank in a sulphide field is about 18 months. This length of service is obtained if the lease tank is continually in use. During the latter part of the life of the field, if the lease production falls off and the tank remains idle, a portion of the time, its life will increase proportionally.

Exhaustive tests have been made both of materials of construction and protective coatings for lease tanks. In these tests it was found that aluminum was the only metal capable of fully withstanding hydrogen sulphide gas which could be used to fabricate lease tanks. Subsequent tests of aluminum lease tanks have shown that this material fulfills its promise of corrosion resistance when used in the vapor space of the tank. When used

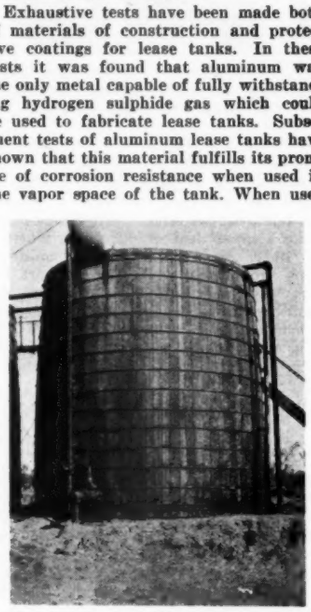


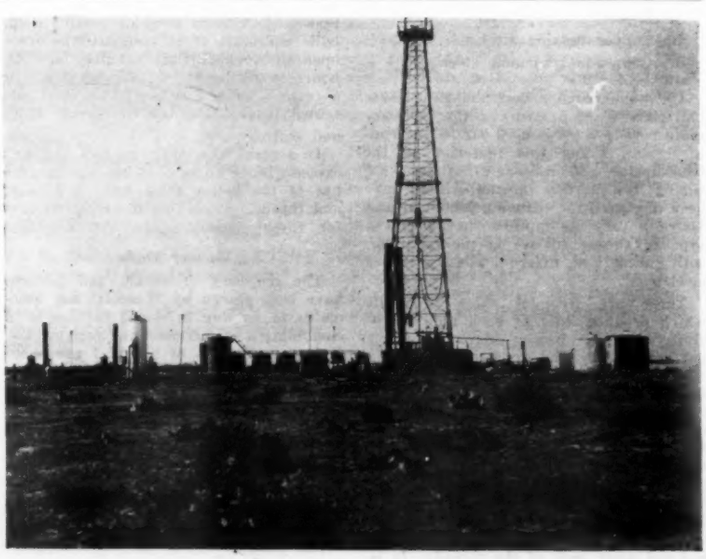
Fig. 12—Vapor-tight wooden tank after 36 months' service with sulphide oil

as the bottom of a tank it is subject to serious corrosion from brine attack and its service life is not satisfactory.

The normal procedure in cases where steel lease tanks are subject to hydrogen sulphide corrosion is to use them until holes develop through the bottom. The tank is then repaired by concreting the bottom and part way up the side wall. If the deck is in bad condition it is usually replaced with an inexpensive wooden roof covered with tar paper. This type of repaired tank, although not vapor tight, often continues to give satisfactory service for a number of years.

Recently extensive tests have been conducted on galvanized wrought iron and galvanized steel tanks. The tests have proceeded far enough to show that the use of either galvanized steel or galvanized wrought iron will give an added life over black steel sufficient to more than repay the cost of the galvanizing.

The increased service life offered by galvanized tanks has one serious competitor in vapor tight wooden tanks. A number of batteries of these vapor tight redwood tanks have been in use for three or four years under corrosive conditions and their satisfactory resistance to hydrogen sulphide attack has now been established. They are subject to some of the usual ills of wooden tanks and probably should not be used for temporary settings which necessitate their being moved frequently. For permanent or semi-permanent installations, however, they may be used with success. Figure 11 is a lease tank deck after 20 months' service in a hydrogen sulphide producing field. Figure 12 is a vapor tight wooden tank after 36 months' service handling hydrogen sulphide fluid.



Completing well in Government Wells field, Duval County, Texas

Methods of Pumping in Gulf Coast Area Vary With Individual Well

Methods and equipment for the production and recovery of oil from Gulf Coast wells which have ceased to flow naturally are receiving more serious consideration of the operators at this time than ever before. Such consideration is being prompted by the need for providing the most efficient and most economical means possible for the artificial lifting of oil. This is resulting in a transition from the old haphazard pumping of wells to the application of practices based on scientific study and knowledge of conditions.

In the consideration of pumping production on the Gulf Coast it is becoming more generally recognized that each well is a specific, individual problem, and that the proper method of pumping and type of equipment most adaptable are to be determined by the particular problem of each well. This situation is possibly more true on the Gulf Coast than in any other district of the country. Operators who attempt to standardize on a certain method and type of equipment as applicable to all wells usually find themselves in grief, facing higher lifting costs and lower recovery. This accounts for the divergence of types of pumps being found in modern usage on the Gulf Coast.

Various Factors

Various factors enter into the pumping problems on the Gulf Coast that are not encountered to any extent in pumping in other areas. On the Gulf Coast sands are very loose and silty and give considerable trouble in wear on pump parts and in sanding up of wells which must be protected against. The problem of sand getting into the wells is accentuated by the very steep dips, sometimes as much as 80 to 85 degrees, of the sands which are found and which facilitate the caving of the sand into the holes.

Another factor is water. Gulf Coast pumping wells as a rule are compelled to handle excessive volumes of water with the oil. This increases the pumping load and consequent breaks and wear on equipment, resulting in higher maintenance costs. To lift water, which is much heavier than oil, equipment must be larger and heavier than would be necessary for the same corresponding volumes of oil. In other areas where fluid levels are not so high as on the Gulf Coast, pumping of such volumes of water would be prohibitive.

Crooked holes also have presented a serious problem in wear of rods and other equipment in coastal pumping wells. It is believed that the percentage of crooked holes among the wells drilled before the days of surveying is greater on the Gulf Coast than anywhere else, due to the soft nature of the formations and the dips of formations which tend to deflect the holes. However, as in other districts, in recent years every effort has been exerted by coastal operators to maintain vertical holes and consequently the problem of crooked holes in pumping these wells will be minimized.

Insert Pumps

Insert pumps now are being used more generally on the Gulf Coast than any other type. The sand conditions in coastal wells generally make necessary frequent replacements and repairs to the standing valve and working barrel, and the elimination of the tubing job to make them means an important saving of off-production time of a well. In wells in which sand conditions are not so bad plunger pumps with their greater capacity are used to advantage as pulling jobs may not be so frequent. However, it has been found in most cases that the running time of an insert pump during the period of a month is enough greater than that of the plunger pump under the same circumstances that the total production of the insert pump more than offsets the greater daily capacity of the plunger type.

Fluid packed pumps also have gained considerable favor on the Gulf Coast. Although they may have a lesser capacity than other types they handle sand more satisfactorily and do not necessitate the repairs and replacements of parts as in other pumps.

At this time there is a decided trend toward the use of gas lifts. Various types of these lifts have been put in operation in a number of different coastal fields within the past couple of years and in most cases have proved particularly adaptable to the peculiar Gulf Coast pumping conditions.

Of some interest is the fact that the principle of the gas lift originated on the Gulf Coast, although the use of the lift is more generally associated with pumping in other areas. The first gas lift was installed in the early days of Spindletop, and before going to other areas was used in a number of other coastal fields. Those original gas lifts, however, provided for the practice of straight injection of the gas into the wells and blowing the wells, a practice which never proved entirely satisfactory due to the volume of gas required which made the costs excessive. At the same time those lifts tended to create emulsions which were hard to treat out.

After several years of use the gas lift passed out of the picture not only on the coast but elsewhere and was forgotten for some time. It was revived with the Seminole Field, where, because of the extremely crooked holes that were drilled in the hasty development of the field, the use of rods and conventional pumping practices was made a difficult and troublesome undertaking. Later the use of gas lifts again drifted into disrepute but again with the development of methods other than straight blowing of wells the lift is finding greater adaptation to production of oil.

Gas Lift

Various types of gas lift devices have been brought out, including the straight chamber lifts, the mixing chamber lifts and the valve lifts. All have been undergoing great improvement and practically all types now are being tried out on the Gulf Coast, in various places, particularly at Conroe and Refugio. However, installations so far are scattered.

Texas Gulf Producing Co. has just completed a second gas lift installation at Barbers Hill, one of the few salt domes where gas lifts have been tried. In this installation three more wells have been equipped with gas lift devices. This company's first installation has been in operation 22 months and has resulted in a very material increase in recovery of oil, and at the same time have been completely self-operating by making sufficient gas for their respective requirements and then some.

Typical of the results which have been obtained in the use of gas lifts in the Barbers Hill installation is the record of one of the wells which was put on the lift after having been shut down for some time and virtually abandoned. By conventional pumping practices the output of this well had decreased to 1 bbl. of oil daily with which it was making about 1,500 bbls. of water. Operation on that basis no longer was considered profitable. On the lift this well now is producing around 2,000 bbls. of fluid daily, of which 125 bbls. is oil. The output has been as high as 400 bbls. of oil, and in the 22 months approximately 100,000 bbls. of oil have been recovered which otherwise would have been abandoned and lost.

The increase in oil production and at the same time lower percentages of water was accomplished by ability of the lift to handle a greater amount of fluid and reduce the head of water. In the entire period of operation of this installation only $250 has been expended for maintenance and with the wells producing their own gas lifting costs per barrel have been neglible. The only operating cost has been that of the single electrically powered compressor. The cost of

(Continued on Page 131)

Interior of one of two compressor stations used in gas lift operations of the Texas Gulf Producing Co. at Barbers Hill, Texas Gulf Coast

Chamber lift installation of the Texas Co. in the Escobas Field, Zapata County, Laredo District of the Gulf Coast

Hook-up of well in gas lift installation of Texas Gulf Producing Co. at Barbers Hill

Extensive Development Assured the Gulf Coast

(Continued from Page 66)

face where basement material may be expected. All formations so far penetrated on the Gulf Coast, even in the deepest tests, are of comparatively recent age not present many miles inland from the Gulf Coast and consequently horizons prolifically productive in inland fields theoretically offer extensive possibilities for development on the coast within the range of drilling equipment and ability to reach great depths.

Original Gulf Coast drilling and production was directed to the exploration and proving up of what are now classed as shallow, piercement salt domes. Only in a few instances, such as Welsh, Goose Creek, Orange, and at that time Edgerly, were there any fields except on shallow known domes. These were concentrated in the flat coastal plain in the extreme southeastern portion of Texas and southwestern Louisiana, an area which today comprises only a comparatively small portion of the Gulf Coast. The above four fields were assumed to be domes but they were not looked upon as a separate distinctive type of dome such as the so-called deeply seated domes of today. Edgerly in more recent years has been proved as a dome.

First salt dome development also was confined to the shallow sands and cap rock overlying the salt. Failure to produce in these horizons condemned the dome as barren, or in proving up such horizons development ceased. No consideration was given to the possibility of sands flanking the domes and after several years in which the shallow possibilities of all the known domes and prospective areas were exploited it generally was felt that coastal reserves had been exhausted.

Shallow Era

In those earlier days of coastal history, wildcatters were limited in their search for salt domes to surface indications such as seeps, paraffin dirt, mineralized water wells or topographical mounds. Even then unless the salt or sands were encountered at very shallow levels there was no way of proving up the domes or production. Consequently there were not a great number of domes or fields. However, production in these shallow fields for the most part was very prolific.

Thus followed a lull in Gulf Coast development which was broken in 1914 and 1915 when with the advent of slightly deeper wildcatting off the edges of several of the older shallow pools oil was found in Miocene and upper Oligocene sands flanking the domes. This occasioned a revival of development around all the then known domes in exploitation of these sand possibilities, and in the deeper wildcatting which ensued resulted in the finding of a number of additional domes which had been missed in the earlier shallower drilling.

This play continued actively until along in 1917 and 1918 when new discoveries began to lag and potentialities in these shallower flanking sands around the known domes apparently became exhausted. This era, however, added a substantial volume of new production to the coast, which in its total has amounted to considerably more than that yielded in the first period. Likewise, each successive development era on the coast has brought into the picture greater reserves and potential reserves than the one preceding.

Geophysical Development

In the period from around 1917 and 1918 to 1924 and 1925 there were few, if any, discoveries of any particular consequence, and again it was believed the reserves of the Gulf Coast had been exhausted. In the meantime, along about 1922, the first geophysical instruments were brought into the Gulf and with them experimental work was started in the application of them to the exploration of additional salt. The first definite results from their use came in 1924 with the checking of Nash, Long Point and Orchard. Surface indications previously had been given of all three of these domes and some wildcatting had been done in these respective areas but it was not until after tests were started on the strength of geophysical findings that the domes were actually proved and rewarded with production. All three of these domes have been officially credited to geophysics, Nash being rated the first discovery. So far Long Point has not been commercially productive of oil although the existence of oil has been proved. Sulphur, however, is being yielded from the cap.

Deep Seated Fields

The advent of the very deeply seated, nonpiercement type of fields with their blanket overlying sands of lower Oligocene and Frio horizons has been one of the most important developments on the coast. These fields, which may or may not be salt domes, usually do not provide any reliable surface evidence of their existence and, being at great depth, easily were passed up in earlier Gulf Coast exploration waves. Their existence has come to light only as a consequence of increasing efficiency of geophysical instruments and practices and deeper drilling.

Exploration and development of these deeply seated structures or domes are actively under way at this time and proving of them is yielding some of the most prolific and consistent production which the Gulf Coast has yet known. Some of these fields may have been indicated in early geophysical exploration but in the light of knowledge of domes and fields of that time their geophysical anomalies were not easily recognized. Thus, it is likely that in the present geophysical play for new structures and fields of the above type additional discoveries will be made, which cannot be explained now, but which probably will result eventually in the proving of other oil reserves and different types of fields not now recognized.

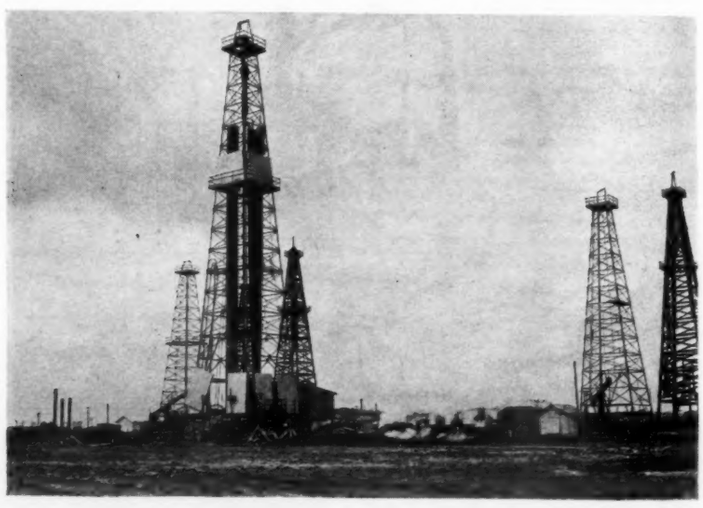
The spread of development outside the salt dome district of southeastern Texas and southern Louisiana has revealed additional petroleum reserves from fields of still different types. Down the coast are being brought to light the existence of fields of the Pettus district, Refugio and Greta types. At the extreme end of the coast is the Laredo district, sometimes considered with the Southwest Texas district, where an extensive oil reserve is being developed and which is drawing the attention of the industry in the exploration for new possibilities.

Inland Trend

Inland from the coast in a strip of country bordering the coastal plain are the potential reserves of the Conroe type field. Particular attention was paid to this "trend" since the Conroe Field came in late in 1931. That field has added a reserve of more than 500,000,000 bbls. of oil, which under present production practices will not be exhausted under 15 to 20 years. Cockfield horizon, promises to be one of the most prolific sources of new oil on the Gulf Coast although far fields along the so-called "Conroe trend" have been more or less disappointing, except for Conroe itself. However, there is an extensive amount of prospective virgin territory to be exploited.

Within the confines of the Gulf Coast region there now are 160 fields, including approximately 35 known salt domes which are not now producing. While not producing these 35 domes are considered as definite reserves as it is more than likely that all eventually will be productive in some way. Several of these nonproducing domes have yielded some oil in the past and have been definitely established as productive. The majority of domes have been developed only to a limited extent of their potentialities.

In its 34 years of history since the opening of Spindletop in 1901, the Gulf Coast has yielded a total of more than 1,092,159,000 bbls. of oil. In view of the fact that a large part of this has been produced by a relatively few fields, principally such old salt dome fields as Spindletop, Humble, Sour Lake, West Columbia and a few others, it is probable that with more extensive development of the other fields already known, and with any additional fields which no doubt will be opened the Gulf Coast will have an ultimate recovery of many times the volume of oil already taken out.



Deep well in Barbers Hill field being reworked and deepened in complete reconditioning job

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Faster than any bit You have ever used

Green Head 3-Way Bit

Operators all over the country agree that the Green Head 3-way bit is faster than any bit they have ever used . . . that with the Green Head Reamer it makes the ideal hook-up for drilling surface holes.

Green Head Bits are made by a Company that is so vitally interested in being of real service to those who use its products, that they even go so far as to study the formations the bit will be used in, thus enabling you to get the extra footage in less time.

Green Head Bits are made of the finest materials available and have extra long blades that hold to gauge. Circulating holes are properly placed to keep blades clean and prevent heating but do not wash off special hard surfacing material.

One piece four point Green Head Reamer

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Colloids, Crystalloids and Jells All Playing an Important Part in Muds

By C. B. KENNEDYE

The subject of conditioning drilling mud is one which is foremost on the Gulf Coast. A great amount of research is being made along this line and considerable attention is being directed by operating companies and engineers toward ways and means of providing effective drilling fluids. It is being recognized more and more that muds of proper characteristics and consistencies play a vital part in the successful drilling of troublesome formations which now are being encountered in an ever increasing extent with the deeper drilling going on along the coast. What constitutes these proper characteristics and consistencies of mud and how to provide them is a matter on which there is some divergence of opinion.

An ideal drilling fluid is one that will efficiently carry cuttings from the hole, and quickly make an impervious wall on the drilled hole, thus preventing excess water from entering the formation or water, gas or oil from entering the drilled hole. Such a drilling fluid should be fairly high in colloidal content, low in viscosity, have a low rate of gelation, have no sands and only 1 to 2 per cent of free water, and above all, be a stable homogeneous mixture for maximum safety and efficiency. Providing the mud is of this character, it will perform all other functions efficiently, that is, lubricate the drill bit, drill pipe, and in running casing, prevent bridging or precipitation and last, but not least, aid in getting a good cement job. The weight, viscosity and rate of gelation should be governed by the formations being drilled, while the colloidal content should always be maintained as high as is practical, and the percentage of free water should be kept low.

Colloids, Crystalloids and Jells

As early as 1861, Thomas Graham, in a paper published before the Philosophical Society of London, described the results of aqueous solution. In a water-clay mixture, the particles which passed through filter papers but not through parchment, he classified as colloids (from cola-glue). The class above this, he called crystalloids, the colloids being so small they could only be detected through a Zeis ultra microscope, the crystalloids are very much larger in size and of a different structure. Mr. Graham pointed out that in a water-clay mixture by continued agitation, a suspension of fine particles could be obtained and that these become finer and finer until a colloidal solution is reached. When sufficient of these colloidal particles, glue-like in nature, are present in a solution, they form jells. These jells have close affinity and form chains of jells if allowed to stand or if allowed to channel, as in a mud pit. He pointed out that small amounts of various tannin acids would break up these jell chains but an excess destroyed the jells, burning up the colloids and setting up instead a crystalloid structure. He also introduced gas and found it could be removed both by violent agitation and by vacuum. These early observations of colloidal chemistry have not been changed and are fundamental.

Our future supply of high gravity crude oil no doubt will be produced within the next few years from depths between 10,000 and 15,000 feet. To accomplish this without prohibitive cost considerable research will be necessary for the proper selection and maintenance of the drilling fluid. To help solve this problem, there have been designed, built and put into practice, a number of devices which we believe are helpful, all of which are based upon the fundamental principals heretofore outlined.

Rubbered Glue Wall, or Thick Crystal Wall

Drilling mud with sufficient colloidal material, with water as the dispersing medium, will form a thin rubber, glue-like wall entirely flexible, while mud not having sufficient colloidal strength, or one which has been transformed by chemicals, or otherwise, into the crystalloid state, will form a much thicker wall before complete shut-off is obtained. The crystalloid structure wall, in addition to reducing the diameter of the drilled hole, is easily broken away by the drilling string, scarified by the cuttings, and quickly washed away, frequently resulting in sluffing and caving. In the event of a sudden necessity for lowering the viscosity, your geologist or paleontologist will verify the crystalloid structure in practically all chemical treated muds.

In ordinary drilling practice, drilling through most formations, we believe it safe to say that the maximum colloidal content made by the bit and pump through agitation will not average 2 per cent of colloidal content by volume, some muds not any, whereas, it is generally believed that 5 per cent is necessary for maximum safety, speed and over-all economy. Therefore, if you wish 5 per cent colloidal mud, you must either buy some material high in colloidal content, such as the Bentonitic Series, or make it by agitation. The process of buying or making must be continuous since the colloidal content is constantly being used in gluing up the hole. There are certain classifications of wells where economy would justify the purchase of this colloidal material, and others, where it would be economy to manufacture.

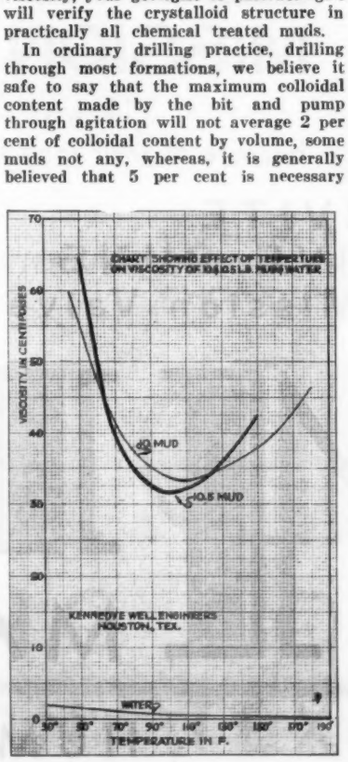
CHART SHOWING EFFECT OF TEMPERATURE ON VISCOSITY OF 10&10.5 LB. MUDS IN WATER
VISCOSITY IN CENTIPOISES
40 MUD
10.5 MUD
WATER
KENNEDYE WELL ENGINEERS HOUSTON, TEX.
TEMPERATURE IN F.

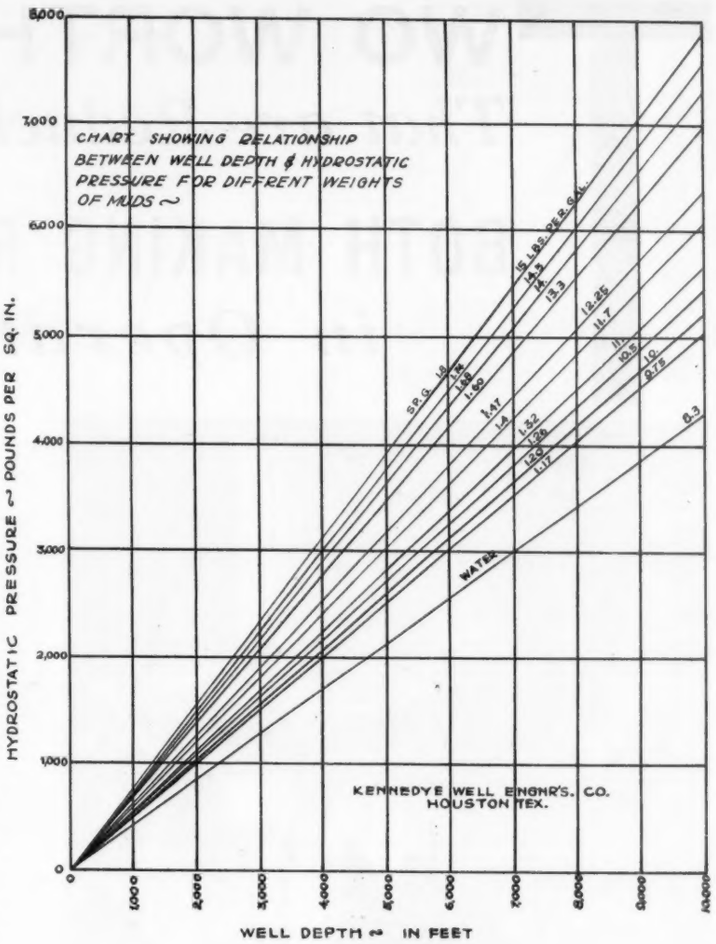
CHART SHOWING RELATIONSHIP BETWEEN WELL DEPTH & HYDROSTATIC PRESSURE FOR DIFFERENT WEIGHTS OF MUDS
HYDROSTATIC PRESSURE — POUNDS PER SQ. IN.
WELL DEPTH — IN FEET
WATER
KENNEDYE WELL ENGNR'S. CO. HOUSTON TEX.

Weight and Water Effect on Formations

Aside from surface charged sands where blow-outs have occurred, other upper sands which have been surcharged through faults from the lower sands and based upon a number of records of bottom hole pressures, we are persuaded that 9.8 to 10.4 pounds per gallon is more than sufficient to shut off any high pressure water, oil or gas sand, and allow for swabbing effect, providing the mud has sufficient colloidal strength and the gas or air not allowed to accumulate and recycle. The accompanying chart showing fluid pressures per square inch in relation to the depth of the well in feet will prove this if you will plot your own bottom hole pressures against it. Two manufacturers of weighing materials have pointed that excessive mud weight is detrimental and will displace oil and gas in the formation (water or mudded off). We believe this is particularly detrimental in any so-called heaving shale or other unconsolidated formation because the pressure becomes equalized a considerable distance out from the diameter of the drilled hole. Experience has shown in quite a number of deep wells recently partially drilled in the Gulf Coast and Mid-Continent Field that these excessive weights have "watered" the formations caused caving also a number of shallow sands have been passed up as a result. While these precautionary measures have been pointed out by the manufacturers, the lumber dealers, who sell mud know nothing about it. Some operators as soon as they get a little gas, use a lot of weight. One well recently used 17 pound mud; many have used as much as 14 pounds.

A glance at the chart will show at depths of 7,000, 8,000 and 9,000 feet, that such weights of fluid head would be more than double the possible formation pressure. Depending upon porosity of the formation, this would mean that the water and the mud itself, with the viscosities being carried, would be forced a long way into the formation, for it would be possible if we could confine such pressures as 6,000 to 7,000 pounds per square inch to force water and mud through a concrete floor. Mud weighing material and some admixtures are an excellent adjunct to safe, deep drilling. They will undoubtedly come into wider use but like any other medicine, or remedy, should be prescribed and administered by an experienced doctor, a petroleum engineer.

Necessity of Thorough Admixture

One other matter in connection with admixtures and weighting materials is the vital necessity of thorough mixture before the materials are pumped into the well, for unless it is thoroughly mixed and is stable, precipitation will take place and stick the drill pipe. One cycle through any mixing apparatus in use on the Gulf Coast which we have observed will not thoroughly mix high specific gravity material sufficiently to hold it in suspension. The result is that a considerable portion of it settles in the slush pit and is wasted. Now, consider a well sufficiently deep with fluid head of 6,000 to 7,000 pounds. We know we have a high bottom hole temperature, the well is attempting to blow out and the mud is therefore gas-cut which means that it is probably 30-40 centipoises higher in viscosity than the incoming mud through the drill pipe and bit because of the high velocity through the tool joints and bit, the viscosity is lowered.

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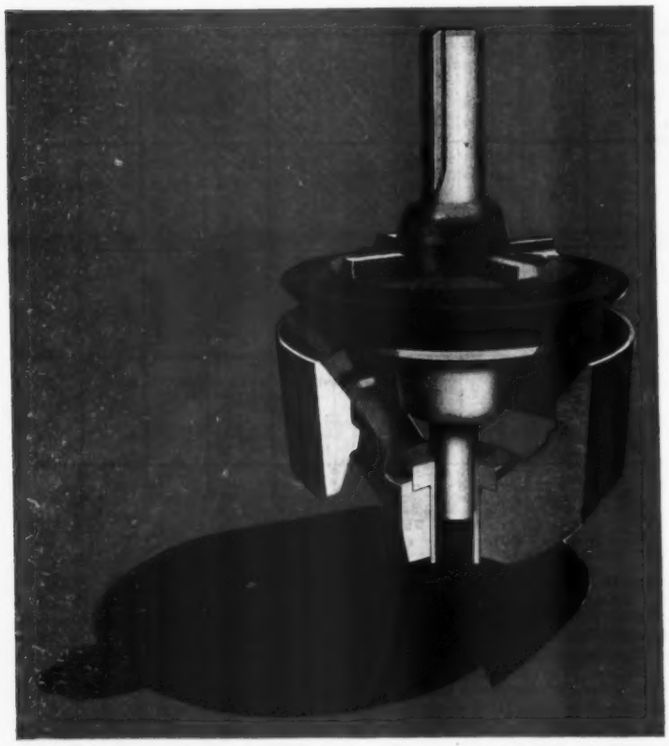
BOTH MAKING RECORDS EVERYWHERE
in Operating Economy . . . .



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give length of life heretofore believed impossible in slush pump valve service.

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likewise saving money for operators because of their long service.

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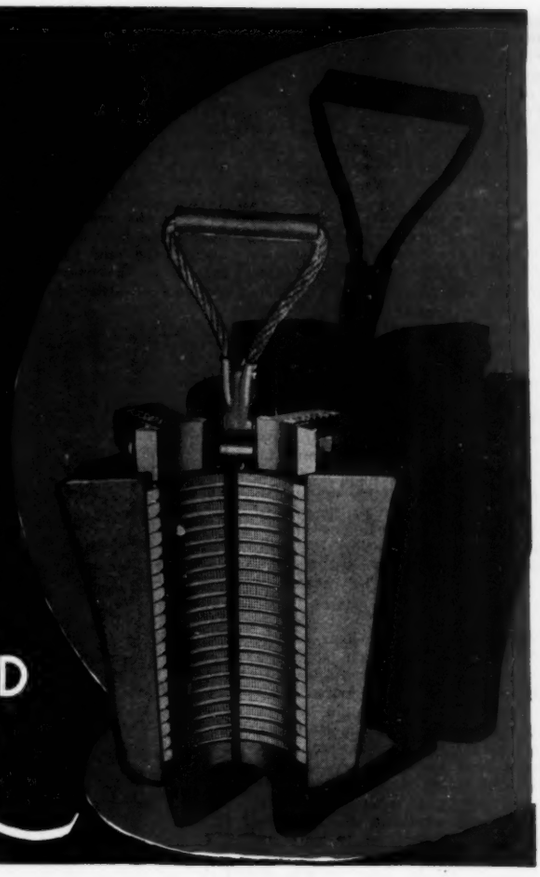

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PAY FOR THEMSELVES IN THE PIPE THEY SAVE

ECONOMICAL *Because*

1. New dogs inserted on the derrick floor put old slips on a par with new slips.
   No costly delays taking slips to shops.
2. Body practically indestructible.
3. Positively will not mar drill pipe or casing.

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VISIT OUR NEW AND MODERN PLANT ON THE HUMBLE ROAD
PHONE: PRESTON 5152

SION

CTURING CO.

HOUSTON, TEX.

Rotation of the drill pipe causes slight centrifugal effect adjacent to itself and channelling or hydraulicing takes effect. How many times has the cement channelled on you, due to the fact that your mud was viscous and the cement slurry of a higher specific gravity and lower viscosity? Several recent failures in the Gulf Coast might be attributable to this cause. You can prove this by weighing your cuttings.

High viscosity muds, 70 to 80 centipoises, are beneficial for most surface work. Cement channelling is almost sure to result with high viscosity, low specific gravity mud and a low viscosity, higher specific gravity cement slurry. We all know of the past and recent expensive blow outs and failures this has caused. At present, there is no better means of preventing this than a coaxial rubber spiral. It is inexpensive and rapidly coming into wide use.

Entrained air, gas, temperature and colloidal content affect viscosity, and, indirectly, the rate of gelation, while not the same, or closely inter-related. All other conditions being equal, the rate of gelation would be proportionate to the colloidal content. Their effect on drilling speeds and efficiency can best be judged by the accompanying chart.

Heaving Shale

We believe that due to fear of the swabbing effect, the majority of operators are carrying too low a viscosity to the detriment of colloidal content. We believe this particularly true in heaving shale jobs because even with 10 pound mud and with the fluid viscosity being carried by most operators, there is an infiltration of water, or water and acid, as the case may be. If laboratory experiments are worth anything, the glue-like substance is not impervious to water at pressures above 3,000 pounds, with average porosity of shale beds. If this be true, then the pressure becomes equalized to a great distance out from the wall of the drilled hole, allows the shale to become slick, the bentonite to swell and Mother Nature's gravity takes over the well.

Some companies believe that 8 per cent of sand by volume (not weight) is not detrimental. Since silica sand is 90 scalaracope in hardness, most pump parts are 40 and drill pipe 30; thus this sand certainly doesn't do the string any good, and, since the colloids are ultra-microscopic, sand does not make for good well building. Therefore, it is advisable to carry over as low a percentage of sand as is consistent with practical economy of installation.

Believe it or not, you are constantly entraining air with the pump suction, running in, spudding drill pipe, etc. It is advisable to keep as much entrained air out of the fluid as is practical and wherever possible, the increased pump efficiently will warrant carrying a head on the pump rather than a suction lift.

De-Gassing

Providing the fluid head is kept 500 to 600 pounds in excess of average formation pressures at corresponding depths and providing the fluid has sufficient colloidal content with sufficiently low viscosity, no gas should appear in the fluid column. There is a necessary time element for mud to seal the wall and no sand should be drilled into rapidly. Should gas appear and the weight of mud is correct, the viscosity should be lowered by water immediately and by having the mud thin in viscosity and thinned out across a wide pit, most of the gases will vaporize and escape. Many of the gas sands which have been troublesome are in the liquid phase due to depth and pressure and temperature and not in the vapor phase, as is sometimes supposed. A glance at a vapor pressure chart of hydrocarbons will convince you. These liquid hydrocarbons at high pressures are absorbed into the crystalloids and mud solids and will not expand and escape if the mud is heavy in weight and allowed to channel in a deep, narrow channel. A shaker will not release all of them because there is practically no separation in the mud column going through the shaker. Two recent tests showed 21 per cent of gas after passing through shakers. All of these gases cannot be taken out except by violent agitation, by vacuum, or by heating. Since some of them are heavy hydrocarbons, other lighter hydrocarbons, which will form vapor gas and disappear if given a chance, the lighter hydrocarbons cling to the heavy hydrocarbons and only by violent agitation and in separation have we been able to take them all out. There have been attempts to remove gas by heating the mud but since the temperature is so detrimental to viscosity and the cost of steam so high, it has been abandoned. To date, we know of no vacuum process having been used and it is believed the expense would make it prohibitive.

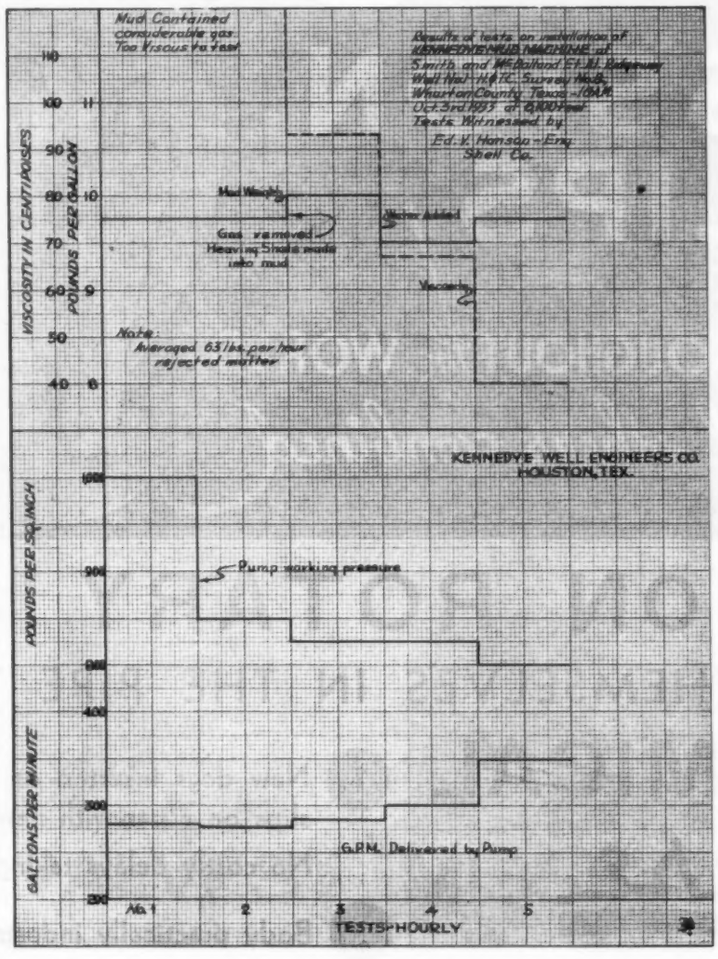
Mechanical Means

At present, there are 18 different makes of vibrating screens (shakers). The art is as old as ceramics. If you wish to get rid of colloidal making material and buy it, they are good. In heaving shale, if you believe in mud and acid they are fine. Their functions are limited to 40-mesh if you have two per well; 60-mesh if you have three per well or 20-mesh if you have one. Shakers will not rid the mud of gas and do entrain 3 to 5 per cent of air by volume. Two major companies have proved this and it's easy for you, too. There is no limit in screen size that will take out all sand. Eighty-mesh screen would still leave 5 per cent sand by volume and unless pressure is applied (not sheer) you cannot screen the volume you must have.

The Kennedye Centrifugal machine is limited also to approximately 40-mesh like the shaker, so you must do something else other than screening or making mud to remove the finer sands. Again, this machine will make the finest quality mud but the weight is limited to the materials being drilled; thus, dolomite, gypsum, anhydrite, marl, lignite, haemitite, bareties, all would increase weight but would have small per cent of colloidal or jell properties.

Temperature Effect

An accompanying chart shows the effect of temperature upon viscosity; some thought must be given to this phase in handling mud, It will be noted from the chart that at 47°F. 10 pounds mud from the Louisiana Gulf Coast shows a viscosity of 60 centipoises while at 110°F. shows only 36 centipoises. This mud contained 4.7 colloids. Now, the same mud as 175°F. was back to 48 centipoises. The 10½ pounds mud, while showing the same parabolic curve, had a lower critical temperature. Our observation of temperatures persuades us to believe that mud, like steel, has a decolescence or critical point and that certain transformations take place at this point. Believing it will be necessary and possibly profitable for future deep drilling, we are attempting to work out an economical temperature control for we have observed some interesting effects in screen setting in high bottom hole temperatures. In connection with the above temperature curve, we have found it entirely practical in this connection to use exhaust steam for increasing mud temperatures, thus lowering viscosity without sacrificing colloidal content until the well is sufficiently deep to create the necessary heat. Such an installation was installed approximately a year ago in Louisiana and the reduction in sand content was very noticeable. To illustrate the efficiency of de-gassing by agitation and its effect on over-all efficiency, the accompanying chart shows that on a well in Wharton County, the mud was so viscous it required jets to remove it, the pump knocking at 1,000-1,100 pounds pressure. By removing the gas, air and 63 pounds of floating material per hour, the viscosity was lowered so that it could be read in one and one-half hours, at which time it was 95 and then down to 40, during which time the pump pressure lowered to 800 pounds and was delivering 350 gallons of fluid per minute as against 260 gallons. This test was conducted by an engineer, R. N. Bean, sales manager of the McEvoy Screen Co., and witnessed by Ed. V. Hanson, engineer for the Shell Petroleum Corp.


Mud Contained considerable gas Too Viscous to test
Results of tests on installation of KENNEDYE MUD MACHINE at Smith and McDallard Et Al Subsurface Well No. 1 H.T.C. Survey No. 8, Wharton County, Texas - 10 M. Oct. 3rd 1933 at 6,400 Feet. Tests Witnessed by Ed. V. Hanson - Eng. Shell Co.
VISCOSITY IN CENTIPOISES
POUNDS PER GALLON
Mud Weight
Water Added
Gas removed
Heaving Shale made into mud
Vacuum
Note: Averaged 63 lbs. per hour rejected matter
KENNEDYE WELL ENGINEERS CO. HOUSTON, TEX.
POUNDS PER SQ. INCH
Pump working pressure
GALLONS PER MINUTE
G.P.M. Delivered by Pump
No. 1
2
3
4
5
TESTS-HOURLY

Reserve Pit and Centralized Mud Reserves

One of the big economies on a deep well is the proper provision in advance of the reserve pit, or in a proven field, central reserve pit. Providing the air, gas and sand content is kept low in the drilling mud the longer mud is worked, the finer and finer the particles become, until a portion of them become colloidal. As it is necessary to jet out good mud and sometimes bad mud frequently, the reserve pit should have a refuse section, and one or two sections for good mud, since frequently all the mud needs is additional colloidal content, which may be purchased or made through re-working. In a proven area with a number of wells, a central mud system will pay a handsome return for shallow wells, making it easy for crew to draw on mud from reserve pit will save much well trouble and much mud money.

The cost of a good layout is so slight the saving effected in a well of 5,000 feet, or deeper, will more than pay for its installation. Where no machine is needed, the cost of baffling the ditch as shown in the blue print is exceptionally low in first cost and can be used for a number of wells. It will more than save the cost on pump parts and steam. A small part of the scheme, but one which makes for its quick and easy installation is the small boomer clamps which boom the 2x4s to the wood or steel baffles. In moving to another location, the pits are jetted out and the entire baffles dismantled in a short time ready for re-use.

It is obvious from the foregoing fundamental facts that to make or keep a good quality mud, a number of functions must be performed in operation of the centrifugal mud machine and process for handling muds, the returns coming directly from the well entering the settling tank. This circular tank with a conical shaped bottom has a capacity of 50 bbls. of fluid. On the inside of the tank an arrangement of spiral baffles forces the incoming fluid laden with cuttings to travel in a spiral direction from the outside to center, slowing the velocity materially. Only the lighter fluid is skimmed off the top from where it enters the centrifugal mud machine proper. This allows the larger cuttings, the necessary time element, to soak up water and by constant washing of the fluid from the well separate the heavy sands, gravel, boulders and the like, from the sticky shales, gumboes, etc. The sticky shales and gumbo, for the most part, makes for the finest drilling fluid, if properly worked. Shell, gravel, boulders and the heavy coarse sand remain in the bottom from whence they are jetted away to a refuse pit. The fluid which enters the mud machine proper is forced through a fine oil well type screen wound backwards so that the flat side of the trapezoid wire faces upward, thus preventing clogging.

Description of the Machine

The centrifugal mud machine proper is composed of heavy H-beam frame, a 6-inch shaft with a double helix of rubber broken at frequent intervals, encased in a horizontal steel shell. The shaft operates on torque and thrust bearings, being driven by a small twin steam engine, horsepower required, approximately one. Attached to the machine proper is a distributor ditch which permits flooding of the entire screen, regardless of the volume produced by the pump. Prior to the addition of the distributor ditch, as the well became deeper and the pump producing less volume, it was frequently necessary to open the machine to prevent balling up.

Coarse sand, gravel and the like, such

as some classes as heaving shale which contain so much dissolved salts and which will not pass through 40-mesh is carried forward and dropped below the machine, whence it is jetted to the refuse pit. The good mud which has been thoroughly agitated enters the mud pit from below the machine. Any entrained air or gas has been released by violent agitation. The helical rubber shaft operates at any desired speed up to 550 RPM. In heaving shale, the speed of the machine is reduced so there is a continuous ejection of the shale with no attempt to make mud from it. The question of whether to make mud from the colloidal material in heaving shale is still a debatable question but should be given considerable thought.

The writer and two petroleum engineers, as well as one large chemical laboratory, believe that certain chemical reactions occur with certain types of muds and admixtures which cause a marked swelling effect of the bentonitic streaks in some heaving shales. The pressure which would occur from this accelerated swelling effect cannot be calculated. One of the marked beneficial effects obtained with the centrifugal machine is the low percentage of free water which it is necessary to carry without the necessity of a high viscosity or without the use of acids. Referring to chart of two typical wells, it would be noted that with the exception of three shots of chemical, the viscosity was controlled entirely with water in drilling through approximately 500 feet of pure bentonite. It was only possible to lower the viscosity four seconds with the use of caustic soda and quebacco, while by judicious use of water, it was lowered to the desired viscosity without any marked increase in the percentage of free water. Since water is the best dispensing medium and is conducive to quick and proper wall building, but also waters off the sand if you let it, this phase of the mud should be closely watched. Most acids are detrimental to steel and rubber.

Efficiency

The overall efficiency of proper control of mud regardless of weight necessary can best be judged by the chart showing two typical Gulf Coast wells. Solid lines show well drilled with a centrifugal mud machine, mud made from native cuttings, acid cost $2.70 drilled in 31 drilling days. Machine lowers viscosity 10 to 20 centepoises by agitation. This producer wanted 9.8 mud per gallon.

Dotted lines show well drilled with native and purchased mud attempted control of viscosity with acid cost $3,810.80 and require 54 drilling days; formations were typical.

Southwest Texas Area Is Attracting Operators

(Continued from Page 68)

and north to Llano County, covering an area of approximately 11,722 square miles. Although no commercial production has been developed, the large acreage that has been held under lease for a number of years, and the encouraging showings encountered in the small number of wells drilled, makes this area inviting.

South end of Government Wells field, Duval County, Texas

The total acreage estimated in the 10 counties is around 7,322,080 acres. Of this it is said approximately 1,750,420 acres are under lease. Leasing in considerable volume in this area started in 1927 and was increased until 1929. Most of the leases were taken on a 10-year basis with a low annual rental, which has resulted in the operators being content to pay the rentals and hold the acreage until a more propitious time for development. It is interesting to note, that while many leases were being cancelled in other parts of the state, none of the companies reduced their holdings in this area.

Seven Tests Being Drilled

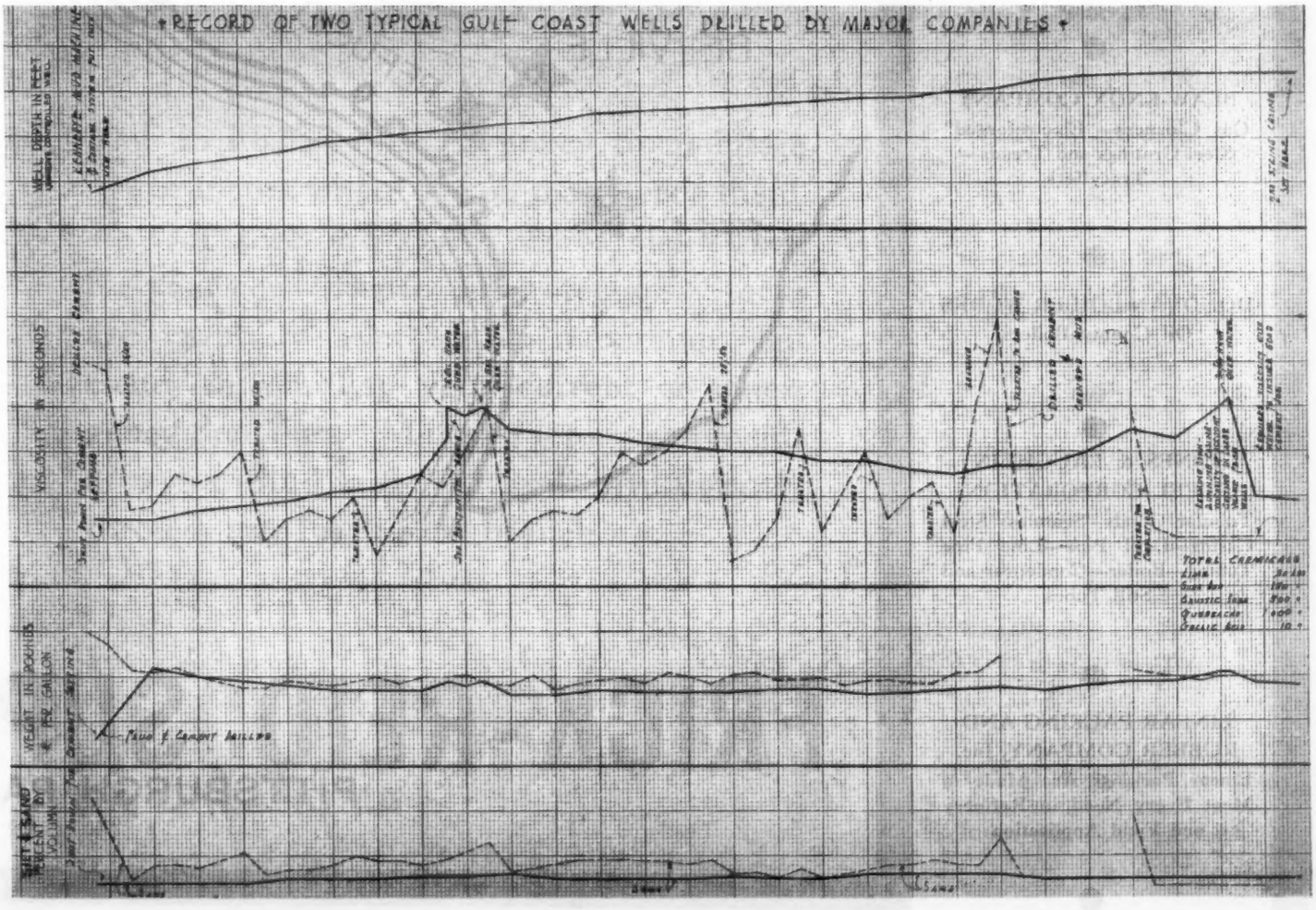
Probably the most attractive feature to this district is the possibility of developing production from the Pennsylvanian and the Ordovician lime. At the present time there are seven tests being drilled throughout the 10 counties. Recent showings made by Eastland Oil Co. and Jeff Love in their No. 5-E Jeff Love, in Southwestern Kerr County, has attracted attention by showing considerable oil in the Pennsylvanian formation at 3,550 feet. It is drilling below 4,000 feet.

Petroleum Prices Dropped As Other Prices Rose

Wholesale prices of petroleum products dropped approximately 2 per cent in January from their levels in February, the monthly price index published by the U. S. Department of Labor shows. The drop lowered prices to 48.8 per cent of normal 1926 levels.

Textile prices, next to petroleum lowest in the group, were approximately 70 per cent normal, while prices of leather and metal products were highest of any of the groups tabulated, being 86.2 per cent and 85.8 per cent of normal, respectively.

Although prices of "all commodities" rose nearly 9 per cent during 1934, the prices of petroleum products dropped about 5 per cent.


RECORD OF TWO TYPICAL GULF COAST WELLS DRILLED BY MAJOR COMPANIES
WELL DEPTH IN FEET
VISCOSITY IN SECONDS
WEIGHT IN POUNDS
PER GALLON
SAND

TYPICAL F-R PRODUCTS

Note the famous names in an industry where recognition takes time and outstanding merit:

AXELSON
Sucker Rods
Working Barrels

BEAUMONT IRON WORKS COMPANY
Rotary and Pumping Equipment
Electric Steel and Grey Iron Castings

BLAW-KNOX COMPANY
Gas Cleaners—"Electroforged" Steel Gratings and Treads—Tracyfiers

DONOVAN BOILER WORKS
Oil County Boilers

JONES & LAUGHLIN STEEL CORPORATION
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Linear Packings Are Made to Meet Every Need in Refinery and Field Application

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Convenient Branches....Capable

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the GULF COAST

Men....Dependable Merchandise

IT IS FRICK-REID'S policy to maintain branches where the oil man needs them. Our stores are YOUR stores, maintained for your convenience and protection. Stocks are carefully selected for maximum efficiency in handling your current or emergency demands. Mill or factory shipments also handled quickly and intelligently through any Frick-Reid branch.

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Steam Pumps—Gas Engine Compressors

RAYBESTOS-MANHATTAN, Inc.
Raybestos Rotary Brake Lining

JOSEPH REID GAS ENGINE COMPANY
Gas and Diesel Engines

REPUBLIC RUBBER CO.
Transmission and Conveyor Belting—Mechanical Rubber Goods

JOHN A. ROEBLING'S SONS CO.
Wire Lines—Welding Wire

WALWORTH COMPANY
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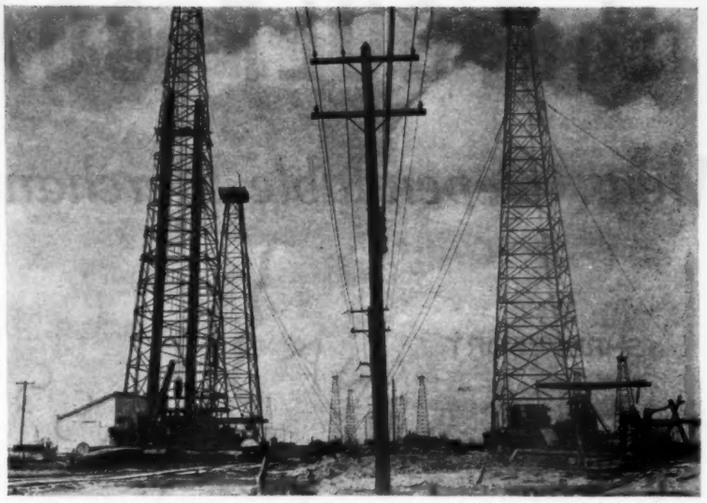
Special Technique Used in Reworking Old Wells in the Gulf Coast Fields

By M. L. CASHION and M. R. REDDICK
Gulf Production Co.



Portion of Pierce Junction Field, southeast of Houston, Tex., where reconditioning of old wells constantly is in progress. At right is a well which has just been put on the beam after a reworking job. At the left is a well in which a reconditioning job is under way

Under proration, low crude prices and the flush production of new wells and especially new fields, the reworking of old producers has not assumed the importance in the Gulf Coast area that it may assume in the near future. Many wells are shut down for economic reasons that with better market conditions could be produced profitably, however, many of these old producers in the older fields have casing in them of such a size and in such condition that in many cases it will be cheaper to redrill than to rework and far less hazardous. In this discussion it is assumed that the wells under consideration can be more profitably reworked than redrilled due, of course, to favorable conditions of the casing, etc.

Within the last few years particular attention is being given to the mudding off of sands of low pressure, particularly old wells known to be low pressure due to their depleted conditions. A great deal of discussion has arisen about screens being mud plugged, about various sulphides and oxides being formed on the screen casing plugging, about the formation and removal of paraffin on the screen causing plugging, about the face of the sand being cemented by various processes causing rapid decline in well production, etc., and a great deal is being done to minimize failure of wells due to these causes. Screens are being subjected to acid treatment to remove the sulphide oxides and to break the cementation of the sand. Various washing devices are being and have been tried to mechanically clean the screen. Chemicals that react, giving off great quantities of heat when brought together in the screen, have been used based on the theory of cleaning through the difference in the coefficients of expansion of the screen and the scale as well as a softening of any paraffin, etc., that may be involved. These and many other ideas too numerous to mention have been and will continue to be tried with varying degrees of success in an effort to revive dead wells. It is believed that some good many be derived through this kind of work.

Oil or Oil Base Muds

Perhaps one of the most important developments in recent years as regards reworking wells is well on the way to a successful conclusion, namely, the use of oil, oil base muds and special highly colloidal muds in screen pulling and perforating jobs. It is believed that before a screen is pulled or washed out that oil or oil base muds should be introduced into the hole. If the pressure to be encountered requires a heavier fluid, then highly colloidal, low viscosity mud of low gel strength and free of shale, etc., should be used. The oil base mud is preferable, because the reduced hydrostatic head minimizes penetration and at the same time permits the recovery of what oil base mud is lost in the sand. This has been demonstrated several times in recent months. This theory is not new and is well founded. After a screen is pulled from the sand the sand should be underreamed as large as practicable with the oil base mud in the hole in order to remove the old cemented sand face and to expose a new sand face that will not be cemented or mud plugged. Certain chemicals are in this oil base mud to cause the cementation to break down and cause the sand to "heave" if the underreamer has not reached out enough. After thus conditioning the hole and after making sure that the sand has broken down all it will, the hole is finally washed to bottom with a bit and the screen is run and set usually hanging if a full hole cement job or full string job is used or the screen is run and set on bottom with very little weight to prevent damage to the screen due to column action. Screens that are to be set in these large holes should be made on heavier pipe than usual to provide a stiffer column. The screen should be washed with oil if possible though the oil base muds should function well if oil is not available. Some operators think that it would be well to displace the oil base muds with water and then follow with oil; others do not want the oil at all. These points will be settled in due time.

Use of Strainers

In the following discussion it is assumed due precaution has been taken to prevent mudding off of the sand preferably by the use of oil base muds. Oil base muds incidentally and by way of digression are muds with no free water.

The use of corrosive resistant strainers has been in vogue for some years without, however, the advice of men conversant with corrosion problems. The usual initial setting consisted of Admiralty or galvanized steel wire wrapped on black steel pipe. If the well fluid is corrosive, the black pipe is soon penetrated and it is soon necessary to rework the well. Nickle strainers were usually run for the second strainer setting. This strainer is almost universally noncorrosive but unfortunately is far too expensive except in the most corrosive wells. Recent developments have been toward the use of galvanized steel pipe or wrought iron pipe with Admiralty wire or galvanized wire wrapped on the galvanized pipe. The use of this type of strainer should increase the life of the wells in which it is set. After the well has produced and the nature of the fluid observed, then the operator may form definite conclusions and make definite recommendations as to type of screen necessary to resist the particular type of corrosion found in the well.

Various methods have been and are being tried to prevent the drilling mud passing through the strainer while washing. The chief development has been cement lined strainers and strainers filled with material impervious to water, though soluble in oil, or that may be removed by other chemical and mechanical means. It is believed that the work is worthwhile since the landing of the strainer in the well in perfect condition is the goal to which all effort and money has been directed during the planning and drilling of the well. A small additional expenditure to insure the proper landing of the screen is certainly justifiable.

Cause for Workover Jobs

The causes of work-over jobs are known to all of you and need not be discussed here. However, whatever the cause of well failure, the well has stopped flowing or has declined to such a small flow that it is unprofitable and it is necessary to rework to get the well back on profitable production.

Wells to be reworked may be classified in several ways though in this paper it was decided to classify these wells in two general classes:

1. Wells that are to be reset in the same sand or a well in which a sand is to be set in that had previously been cased off.
2. Wells that are to be deepened to a lower producing horizon.

The types of jobs usually met in practice under the first classification, namely, wells which are to be produced from the same sand or a sand already cased off may be classified as follows:

1. Wells that are to produce from the sand through the original screens.
2. Wells in which inside screen must be set.
3. Wells which require the pulling of the old screen and the setting of a new screen. Including those cases where it is thought advisable to take in a few more feet of the sand; also wells requiring water shut off.
4. Wells that require testing a sand already cased off.

Types of Wells

These various types of wells will be discussed briefly. If a well gradually sands up and the indications are that the packers, screen and the back pressure valve are intact the screen is washed out by any one of several methods, the tubing is rerun and the well is swabbed in if it will not flow. This is perhaps the simplest of reworking jobs.

If, however, the well sands up frequently and it is known that the screen is of fine enough mesh to hold the sand back and the indications are such that it is believed the sand is not coming through the back pressure valve (particularly if the back pressure of valve is of the screw down type), then it is assumed that the screen is bad or that the packer is leaking and the well must be washed out and a new inside screen set. The screen may be set with drill pipe or tubing with or without wash pipe. If it is thought that the packer is leaking, then the inside liner is sealed above the old packer or a full string of liner may be set. If the well is sealed the tubing may be set on the seal or hung in the screen as the operator desires. In any event it is believed that the screw down back pressure valve should be used to eliminate that constant threat from the picture.

If the particular screen in question happens to be a full hole cement job, cutting the screen out may be very expensive and most impossible to pull. In such cases, only inside jobs can be done unless of course it is desirable to sidetrack. Needless to say few full hole jobs have been pulled and they alone most always preclude the setting of new screen as mentioned above.

Old Full String Wells

In the case of the old full string wells where it is desired to pull and reset the screen, it is often cheaper to back off or cut the liner, set a whipstock and mill out and drill to the sand than it is to try and pull collapsed liners, etc. However, in the newer wells, particularly those that have been sealed, it is usually relatively easy to pull the liner and screen or at least to cut them and then pull them. Often when cutting below the casing it is nearly impossible to completely clean out the hole—in such cases the screen or liner may be pulled say 20 or 30 feet below the casing; the screen may then be sidetracked with a fish tail bit. New screen may then be set in any of the usual ways.

Very often if a well has not produced water during its life and if the operator had quit drilling in the sand the operator frequently feels that upon resetting that he will take in a few more feet of the sand. This is a very good idea if it works and requires good judgment to be right, though likely as not there will be but a few feet of sand before a break and more often than not water will be encountered to add to his troubles. However, great progress is being made in bottom water shut-offs. The wells are back plugged with Aquagel cement introduced either by the dump boiler method or the two plug method. As a rule operators no longer desire to take in all of a sand because of the danger of encountering water, however, if water is encountered and back plugging fails the operator usually sets a whipstock, sidetracks and drills into the sand again, being careful not to penetrate quite so deep in the sand. The back plugging of screens with cement dumped inside of the screen has met with varying degrees of success by whatever method attempted, hence the precaution while drilling to keep out of water.

The last type of well under the first general classification, namely, wells that require testing a sand already cased off are infrequently encountered though if

(Continued on Page 126)

uniform

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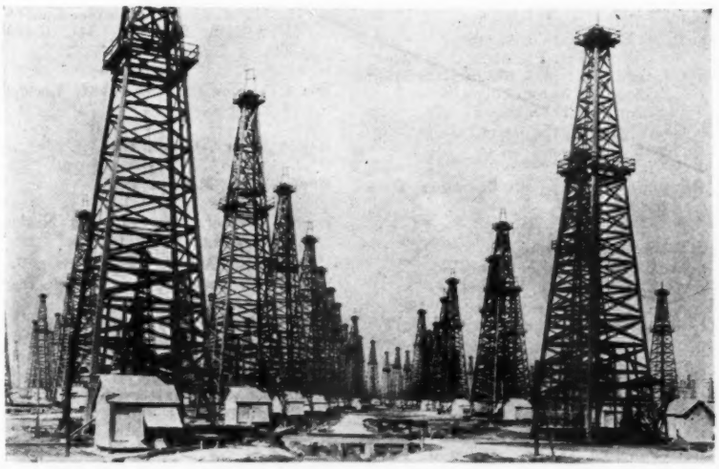

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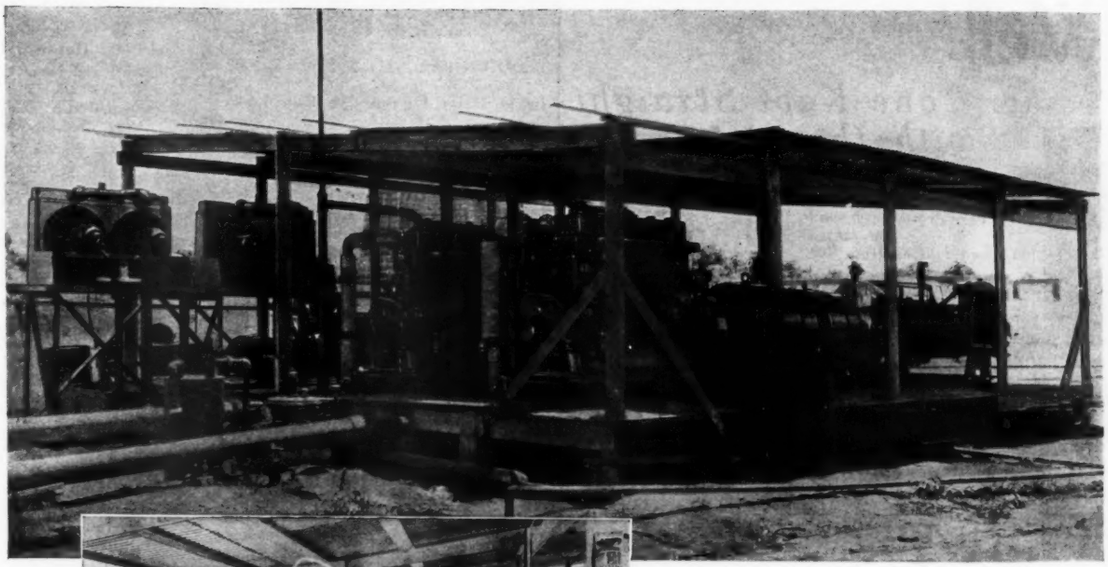

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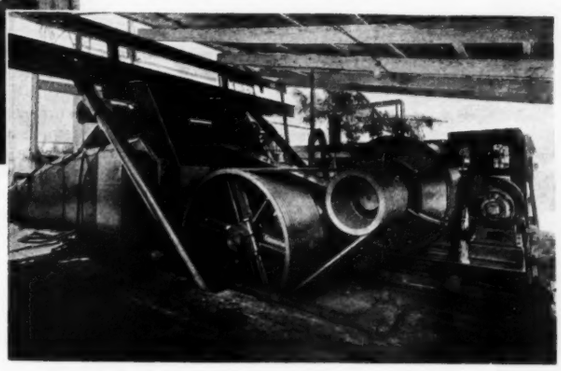

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The H-K Clinograph (designed for open holes only) lowered on a sand or bailing line at a speed ranging from 400 to 800 feet per minute, makes available permanent, accurate photographic records on paper discs of inclination and direction within five minutes after removing instrument from hole. (U. S. Patent 1,812,994 and others pending).

Well!

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The SURWEL is a gyroscopic Clinograph which provides a map of the well at all depths prepared from actual photographic records. Unaffected by *Tortuosity* or *Magnetic Influence*. Self-checking—produces duplicate records going in and coming out. (U. S. Patents 1,124,068, 1,812,994, 1,959,141, 1,960,038 and others pending).

Well!

one Kept Straight with the SYFO Clinograph

The SYFO can be used on a wire line or as a "Go-Devil" running inside the drill stem or on sand or bailing line in open hole. It affords a quick, inexpensive daily record on paper of vertical deviation in drilling—*without* the use of dangerous acids. (U. S. Patent 1,962,634 and others pending).

Photograph below shows sample record made by the H-K. Photographs at right show SURWEL and SYFO Clinographs.

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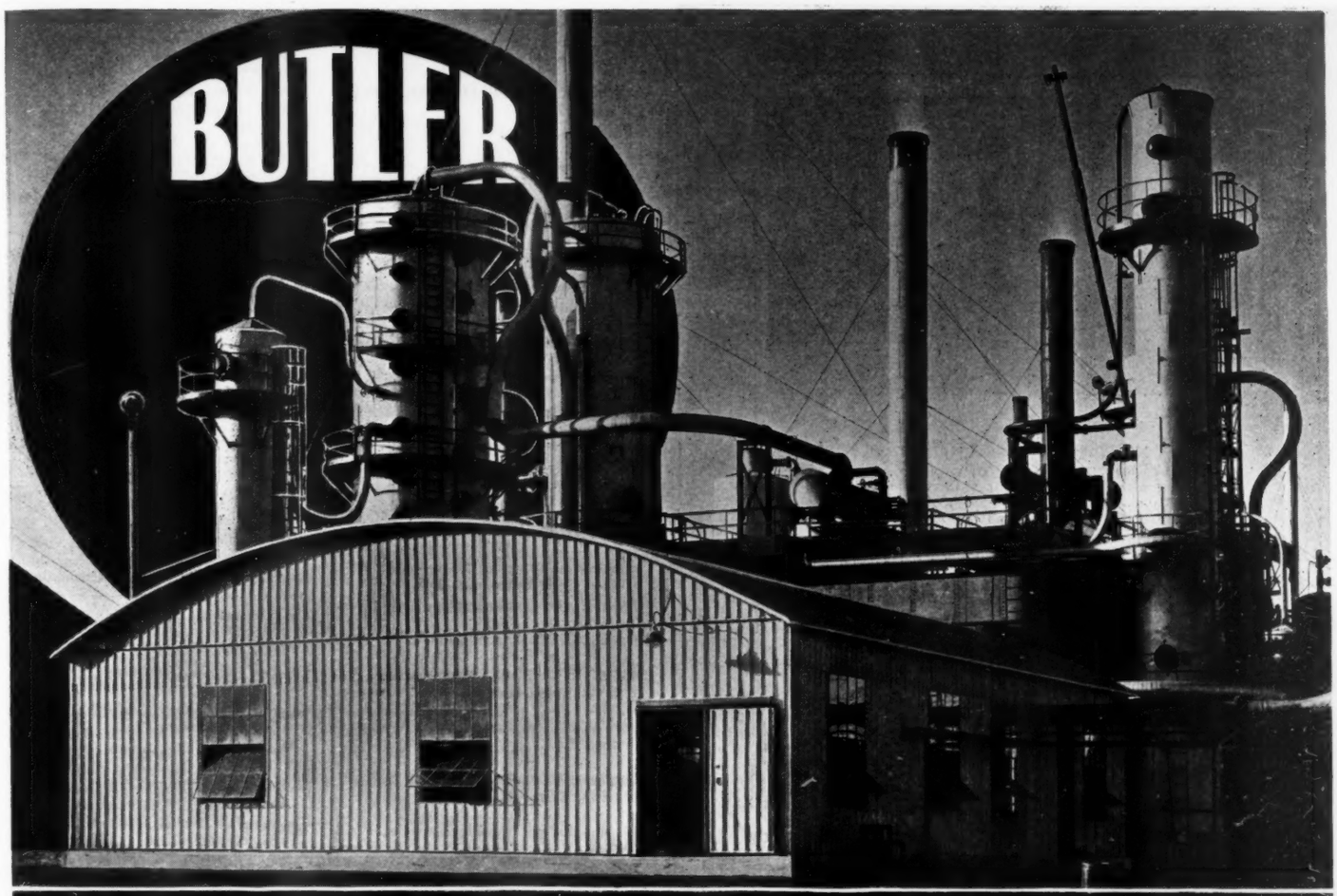

READY-MADE STEEL BUILDINGS SAVE

BUTLER READY-MADE FEATURES THAT GIVE GREATER STRENGTH—FINISHED APPEARANCE

Fig. A—Deeply drawn panel corrugations with side shoulders multiply the strength of wall and roof sections fourfold over ordinary corrugated iron sheets.

Fig. B—Shows the method of closing ends of panel corrugations at bottom and top edges of walls and at junctions of end walls and gable. Also shows how corners are formed in panel sections to eliminate corner laps.

Fig. C—Roof sections are die-formed at the ridge to eliminate the need for ridge roll and to give a stronger, smoother, weather tight finish to pitch roof buildings.

Fig. D—Die-forming also turn projecting eaves downward on a graceful radius. Fine lines throughout give a finished, distinctive appearance.

Fig. E—Shows a simple method of anchoring furring strips with furring clips for carrying interior linings of commercial wall board or plaster on steel lathing.

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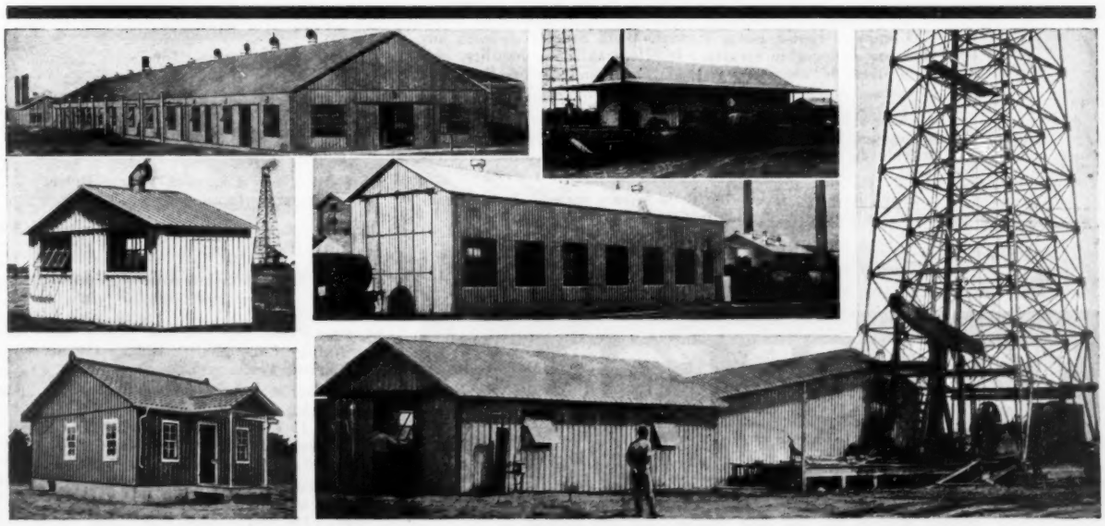

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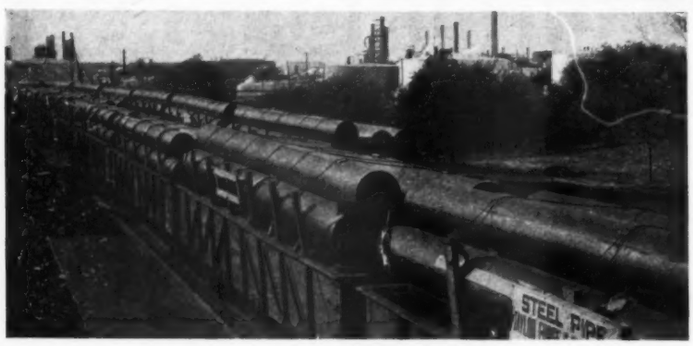

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Write for Bulletin 1000. *Waukesha Motor Company, Waukesha, Wisconsin.*

THIS IS No. 3 OF A SERIES on the Hesselman Oil Engine. No. 4 will appear next month. A reprint of the complete series will be mailed on request.

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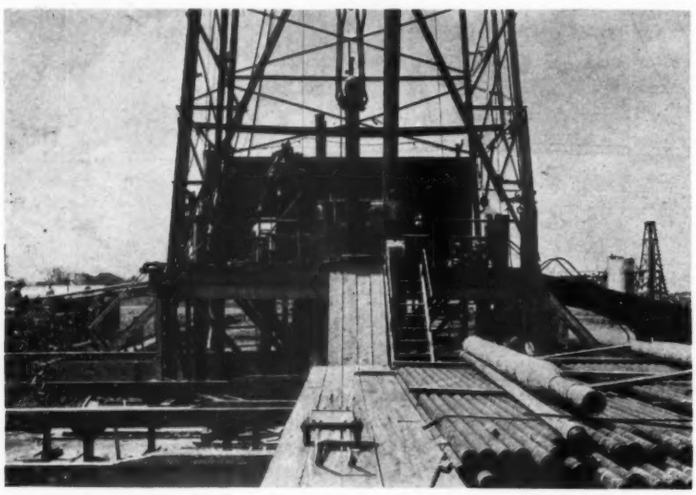

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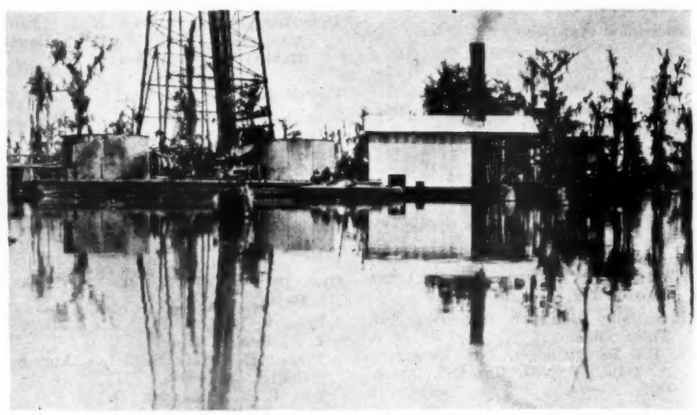

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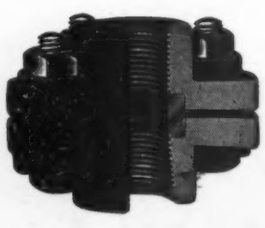

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Pur. Agts., Division Superintendents

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Kurz, A. A., Somerset, Tex.

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L

Lain Oil Co., Somerset, Tex.
Supt., Jack Cude

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Geophysicist, N. H. Stearn
Asst. Geophysicist, E. W. Ellsworth, 604 Wright Bldg., Tulsa, Okla.
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Asst. Dist. Geol., E. W. Ellsworth Tulsa, Okla.; L. L. Palmer, 1122 Milam Bldg., San Antonio, Tex.

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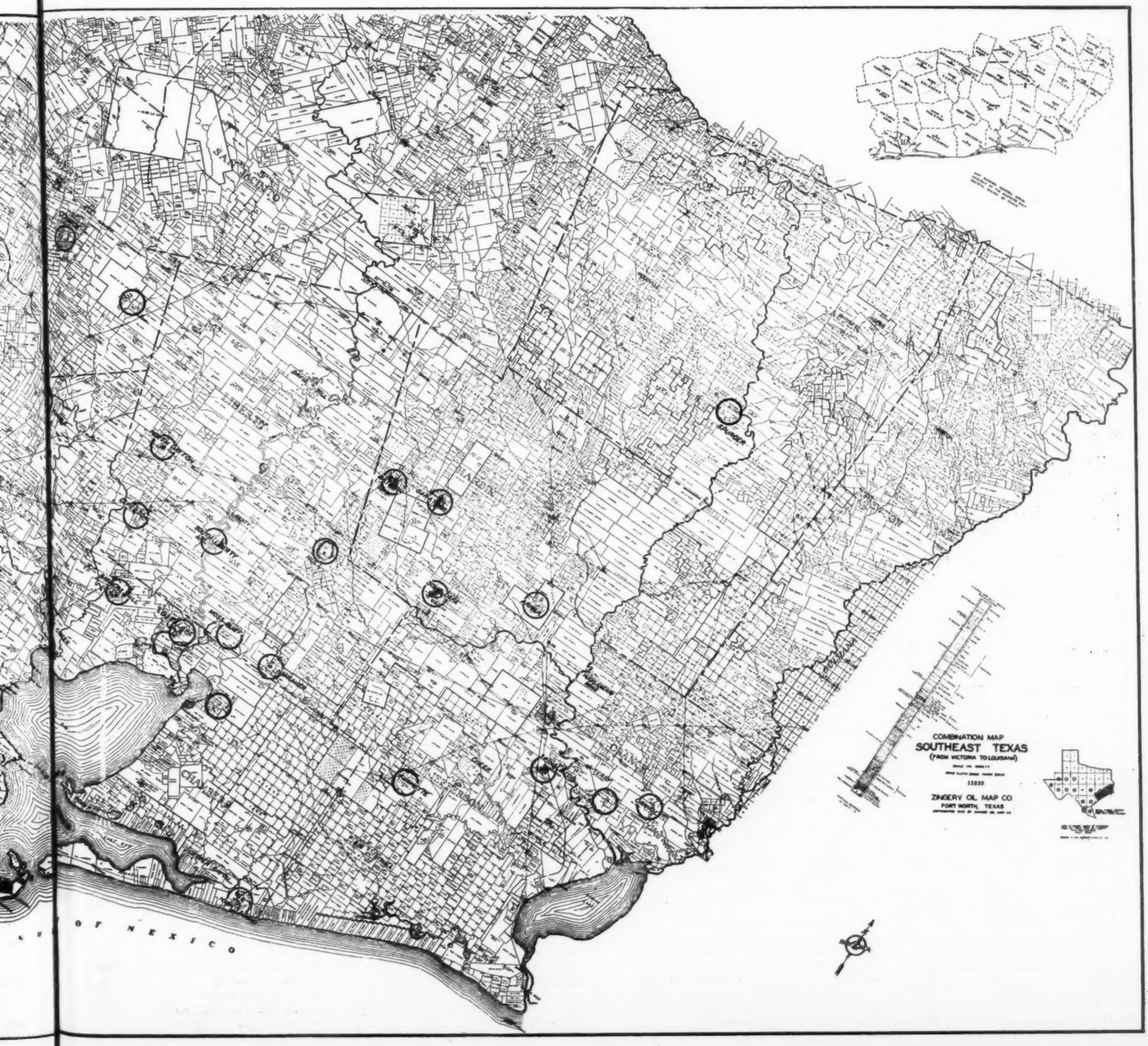

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Ch. Egr., C. H. Black
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Ch. Accountant, Irene Giles
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Land Dept., F. E. Swenson

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Pur. Agt., Mills Cox
Mgr., Traffic Dept., Mills Cox

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Mitchell, J. F., Box 282, Sour Lake, Tex.

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Field Supt., Wm. M. Richardson
Farm Boss, Cleo Dooling, Route 2, Gladewater, Tex.
Mgr., Land and Leasing Dept., A. H. Richardson
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Moss, Geo., Batson, Tex.

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Sec.-Treas., C. W. Kennon, Jr.
Supt., J. P. Kennon
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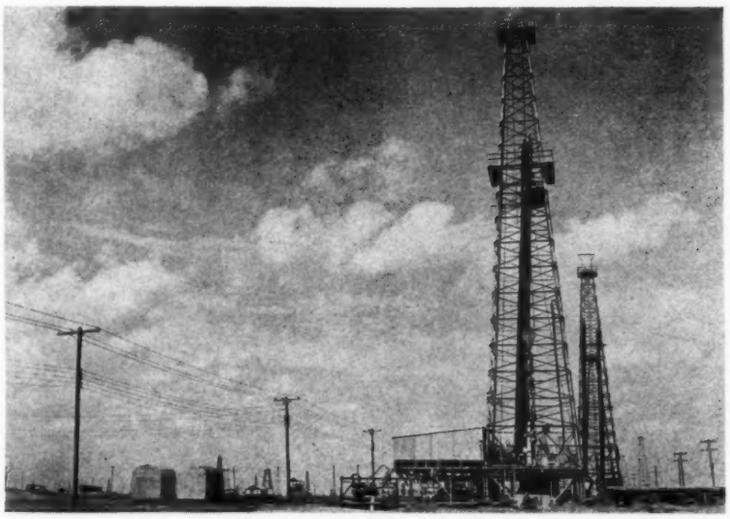
Newton & Lillie, Goose Creek, Tex.

Nichols Oil Corp., Box 688, Beeville, Tex.

Niles, Alva J., et al, Box 336, Laredo, Tex.

Noack & Lanning, Rockdale, Tex.

Noack Oil Co., Rockdale, Tex.



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P

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Parr, J. W., & Co., Sour Lake, Tex.

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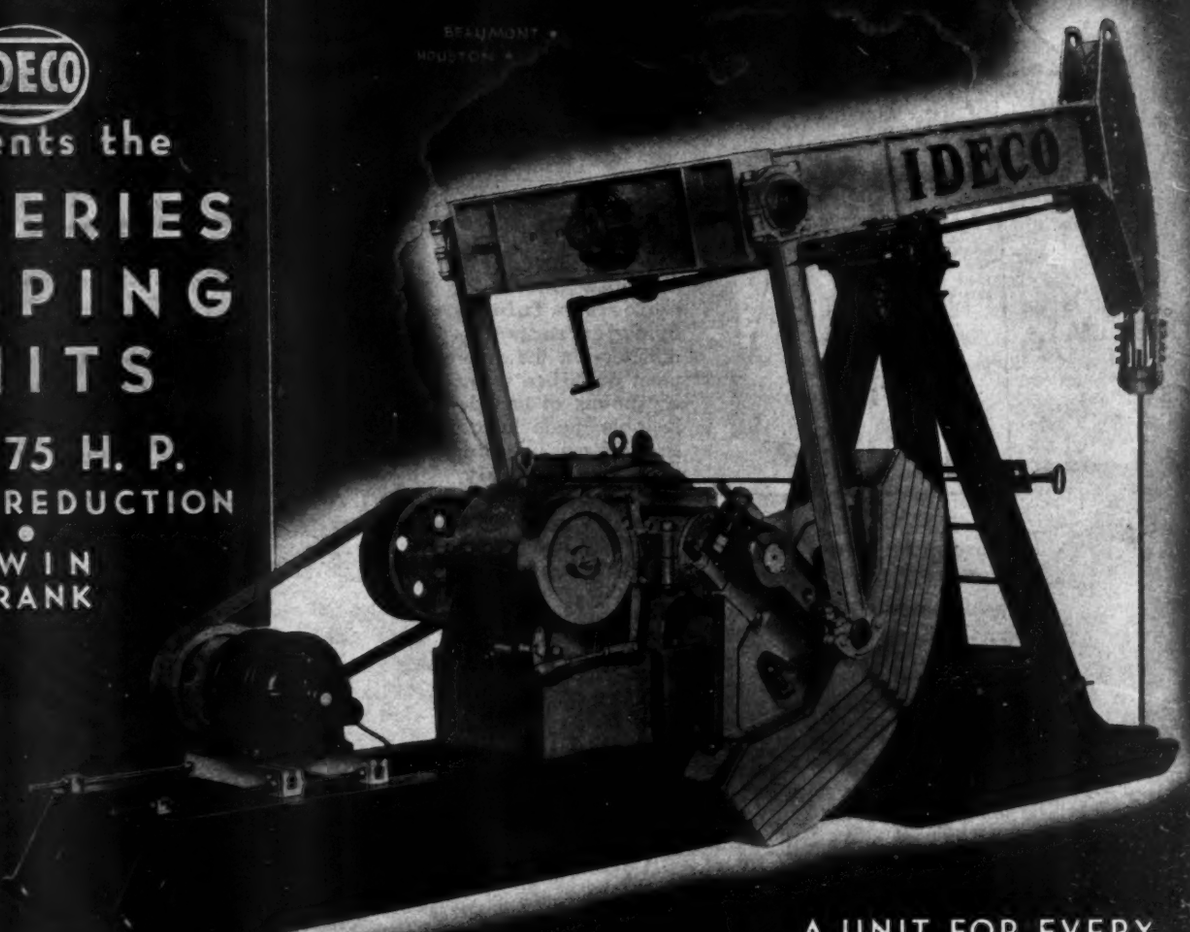

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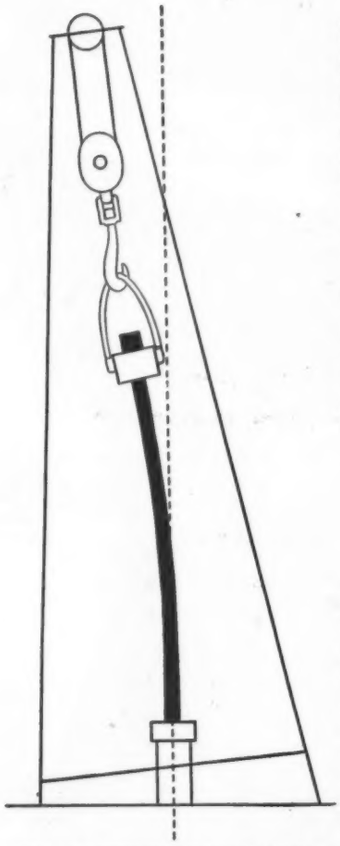

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Supt., J. M. Philp
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Land Man, J. H. McLaren, 324 West Gray, Houston, Tex.
Geol., N. P. Isenberger, Houston, Tex.

Pickerill & Robishaw, Saratoga, Tex.

Pioneer Oil, Gas & Refining Co., care Joe C. Stanfield, Route 2, Box 130, Somerset, Tex.

Pitkins & Goldston Oil Co., 401 Sterling Bldg., Houston, Tex.
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Prod. Supt., Hardy Emerson, Freer, Tex.
Geologists, W. J. Goldston and Geo. D. Stevens, Houston, Tex.

Pivoto, M. E., Sour Lake, Tex.

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Pur. Agt., J. D. Mitchell

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Pope, Ernest, Saratoga, Tex.

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V. P., Wm. Green
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Pur. Agt., Robert R. Stone

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Porter, G. G., 1812 Alamo National Bldg., San Antonio, Tex.

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Sec.-Treas., J. M. Byers
Field Supt., C. A. Farthing, Markham, Tex.

Prairie Lea Production Co., 713 Morris Plan Bldg., San Antonio, Tex.
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Mgr. Land and Leasing Dept., Lee Howell

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Prudential Oil Co., Beaumont, Tex.
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Supt., Ralph Barrow, Sour Lake, Tex.

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Supt., Fred W. Dallas
Asst. Supt., C. C. Brown
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Q

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Night Drlg. Supt., Bob Lemley, Refugio, Tex.
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Rabun, Herman, Receiver for Reward Oil Co., 1814 Alamo National Bldg., San Antonio, Tex.

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Pur. Agt., R. A. Wolfe, J. Z. Werby, 324 Esperson Bldg., Houston, Tex.

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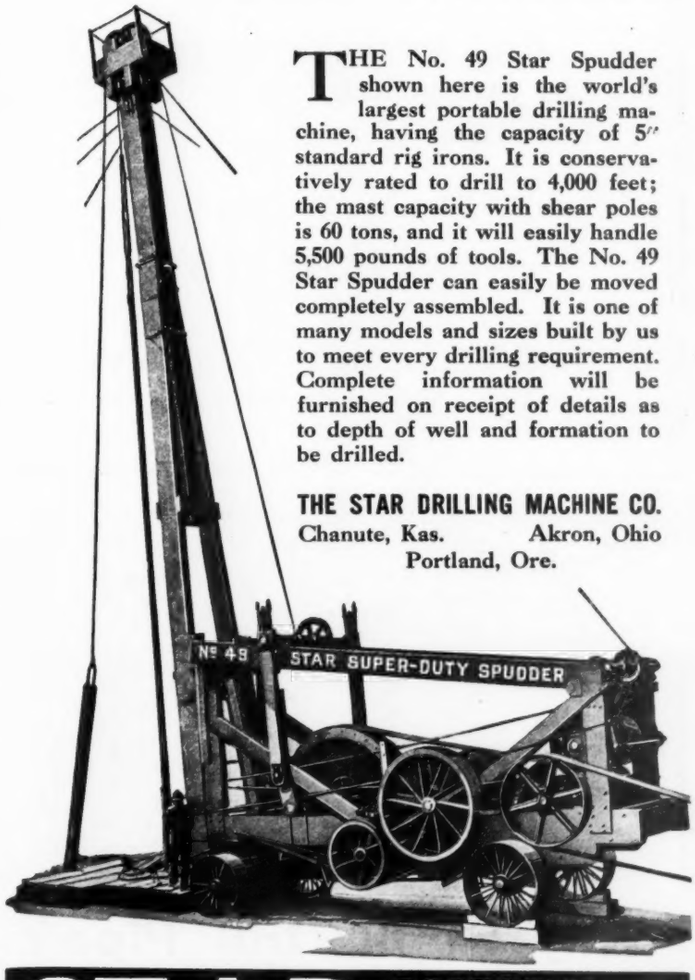

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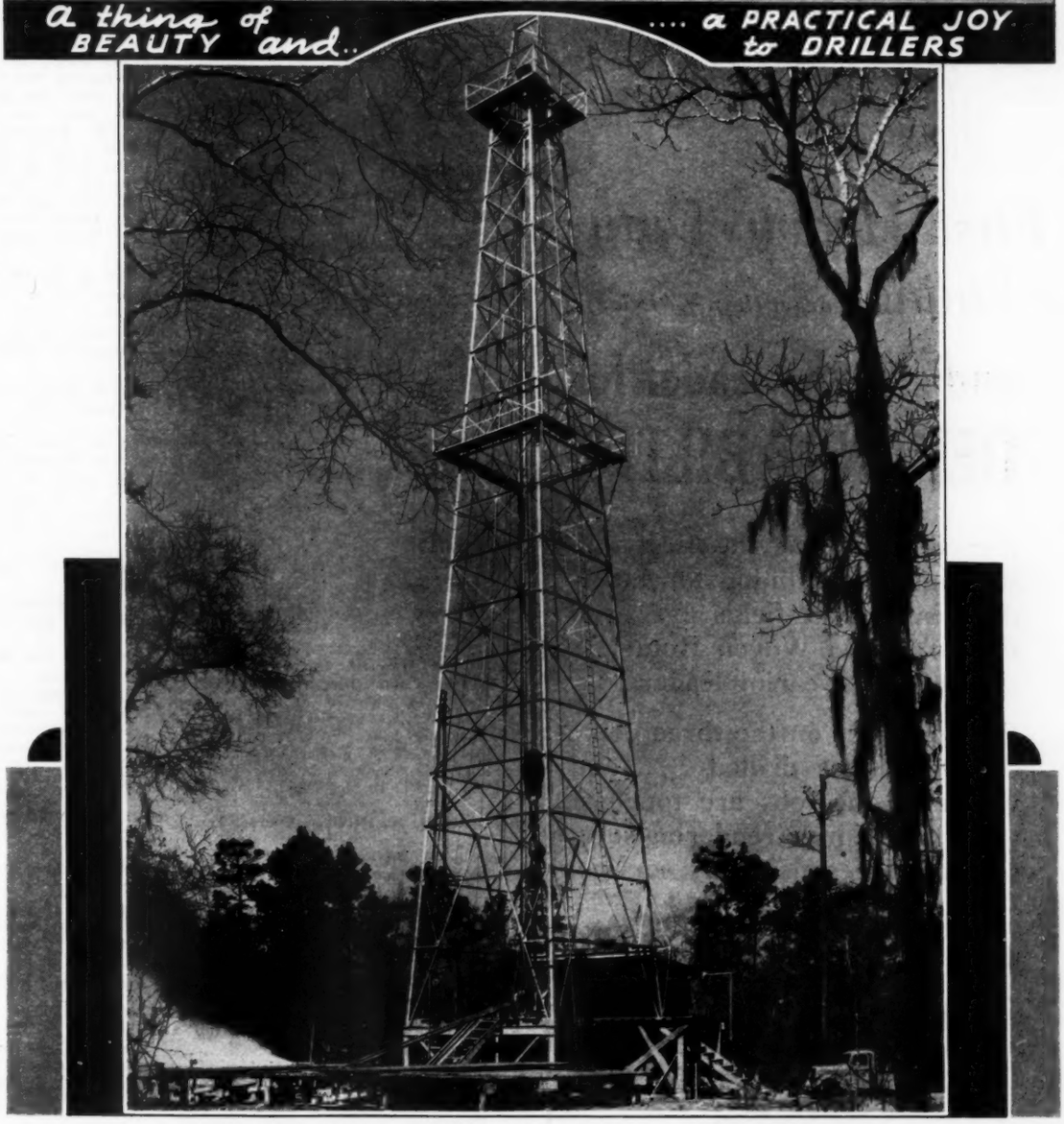

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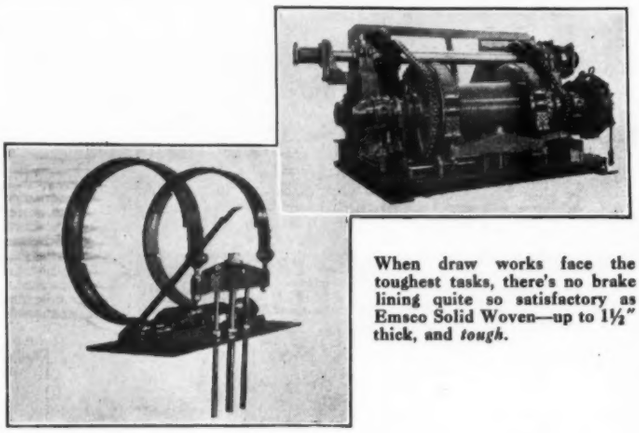

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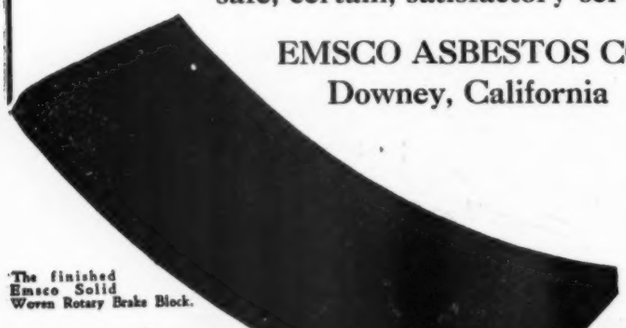

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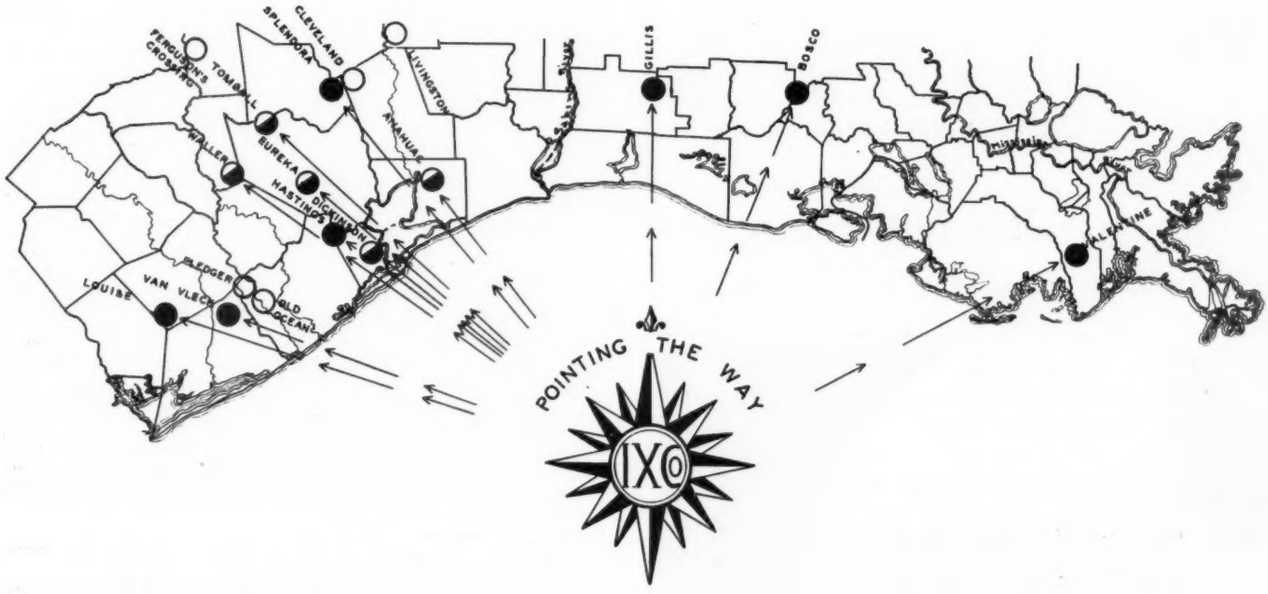

TOTAL NUMBER OF FIELDS found and proved for Oil or Salt, since March, 1932*	17
● Originally worked by Independent Exploration Company with reflection seismograph, and the resulting structure recommended for drilling	7
◪ Checked with reflections and recommended by Independent Exploration Company prior to drilling	5
	12
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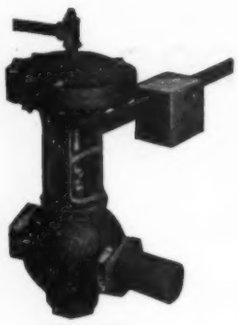

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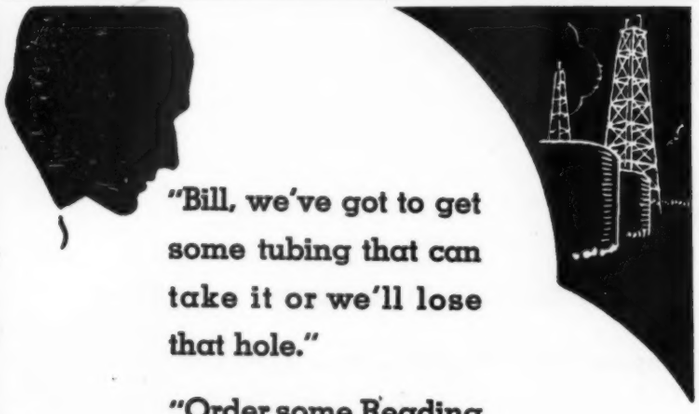

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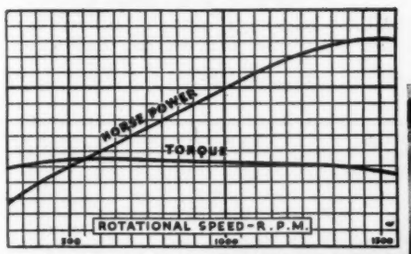

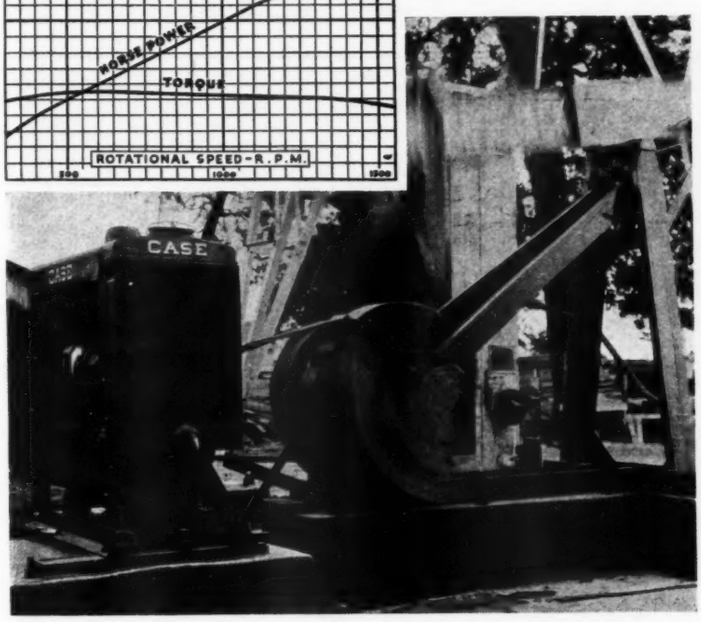

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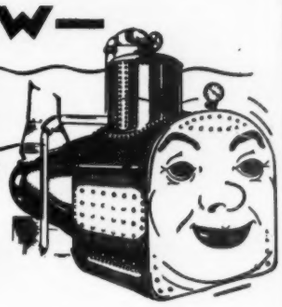

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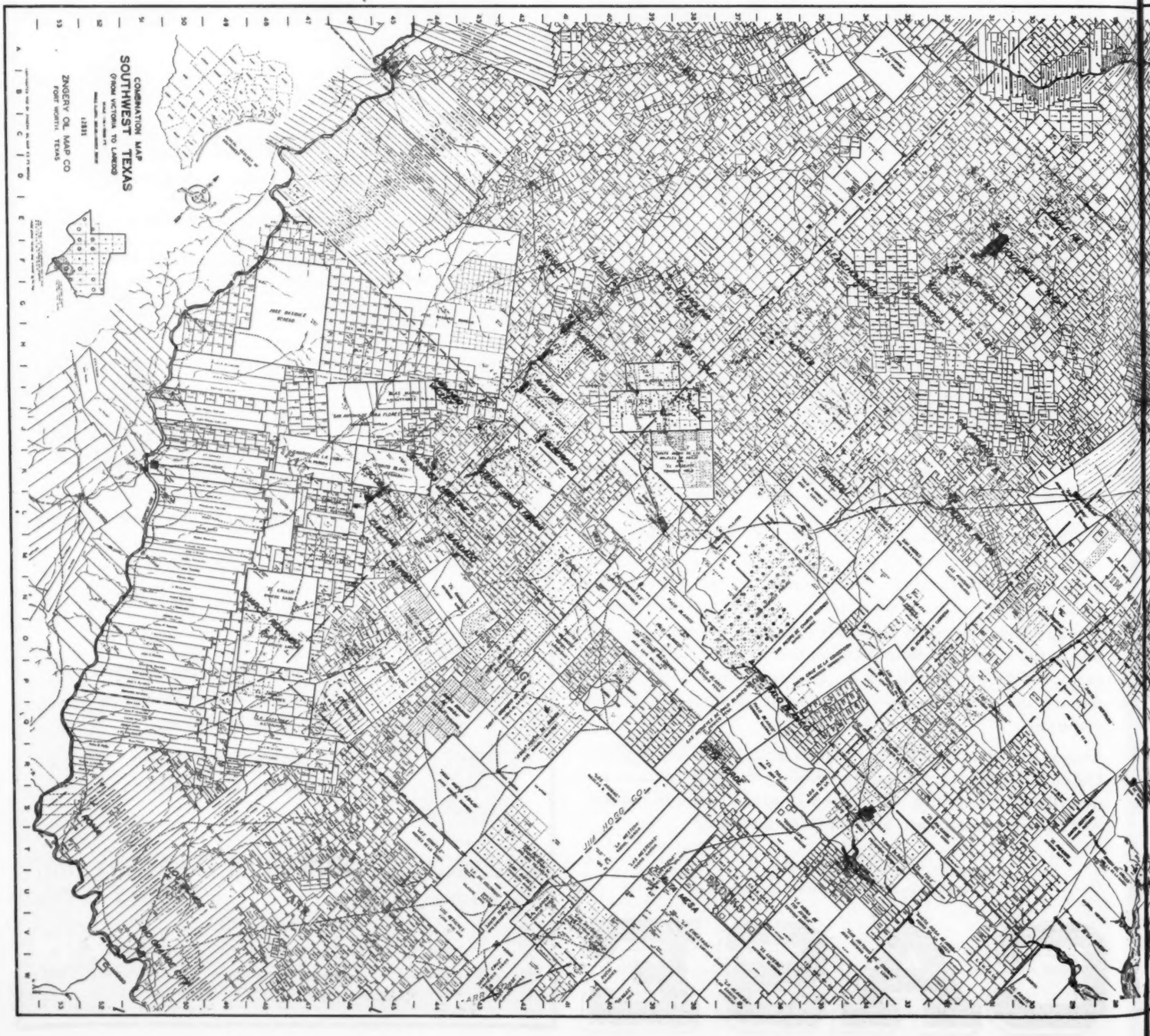

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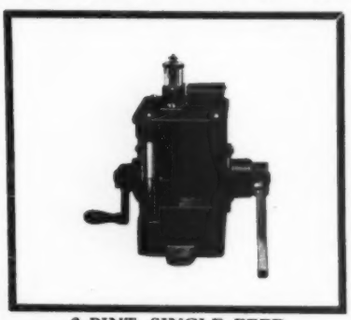

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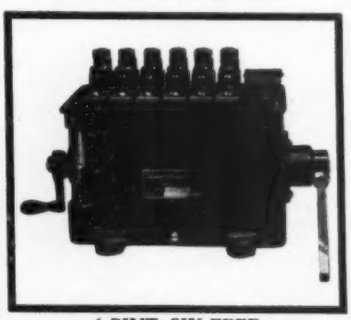
MODEL "ET", TYPE "SF"



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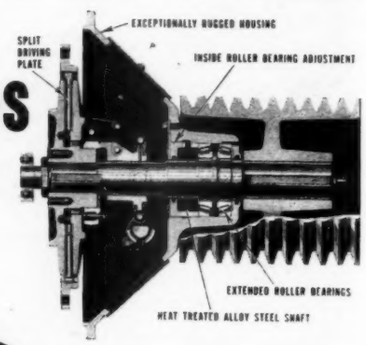

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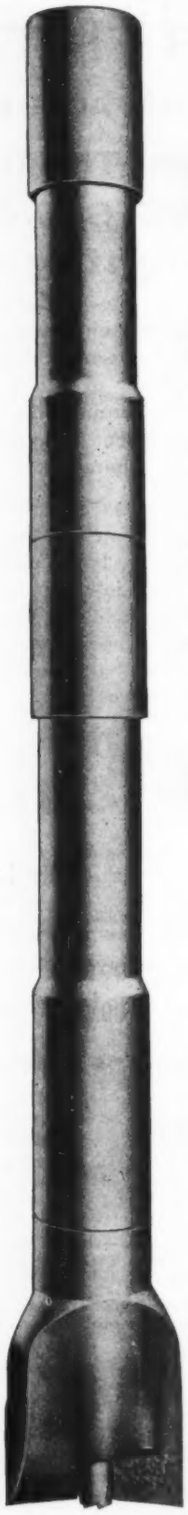

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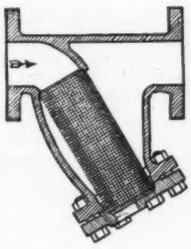

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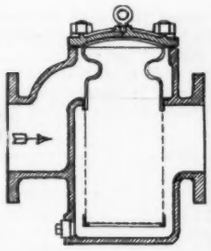

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Special Technique Used in Reworking Old Wells

(Continued from Page 92)

such is the case the well is plugged back with Aquagel cement after which the casing is perforated. Or a whipstock may be set, the casing milled out and the hole redrilled to the sand. The screen is then set in any of the conventional ways and since the procedure is not unlike the previous discussion it will not be discussed further.

Types of Jobs

The types of jobs usually met in practice under the second general classification, namely: Wells that are to be deepened to a lower producing horizon may be classified as follows:

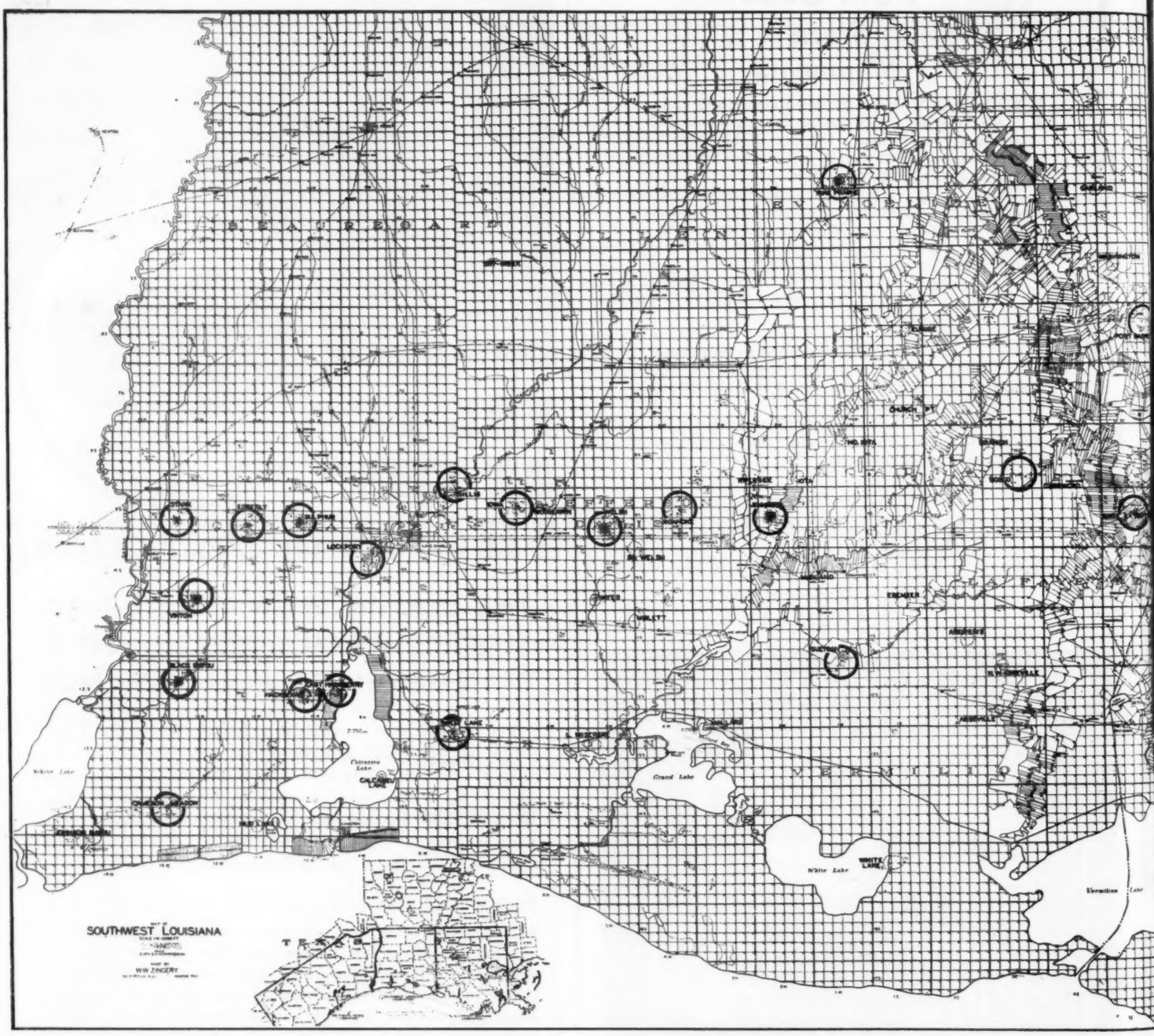
1. Wells that are to be drilled to a new sand immediately below or near the old producing sand.

2. Wells that are to be drilled to sand of unknown depths below the old producing sand.

If through the drilling of other wells on a property a deeper sand is known to be immediately below a depleted or water filled sand the back pressure valve is often drilled out and the lower region explored by coring, etc. If it is possible to drill stem test or if it is possible to run a Schlumberger, or both, and the tests indicate a well then the operator must decide on his method of setting. If he is certain that no deeper sands exist or if the size of the hole is so small as to make it impractical to drill deep, then it might be advisable to set a full hole cement job with a backing off tool placed just above the old liner. After the screen has been set and cemented and due time allowed for cement to set the liner may be salvaged above the backing off tool with no fear of flooding the lower sand with water or of the well making sand behind the liner since the cement will come above the old screen. This is a very good job in this respect if the cement does not get down around the new screen or if it is not definitely known that it will not be desirable to drill deeper. Inside screen jobs are still possible so that the well may be worked over in this sand. Some operators may prefer the use of wall packers, better known as bootleg packers, for water shut off when drilling deeper through the back pressure valve so that they may be in better position to pull the screen for various reasons. However, it is believed that when drilling if the back pressure valve is resorted to the hole is so small that if there is a possibility of wanting to go deeper than the new sand that it is probably better to have pulled the liner in the first place and to have proceeded with the larger hole or to have set a whipstock after the second setting and drilled again to the deeper sands.

Flush Joint Drill Pipe

Flush joint drill pipe has been found to be a great boom to working in small holes since it is possible (and is being done by our company) to core through the drill pipe in 4¼-inch hole, obviating costly round trips with the conventional core barrels. This is accomplished by the use of 3½-inch O.D. drill with the ends of the pipe upset for 2⅞-inch internal flush joint tool joints—the outside diameter of the upset being 3¾ inches and the hole through the tool joint being 2⅛ inches. The pipe will be stiffer than 2⅜ inches and should drill a straighter



hole with less danger of sticking primarily due to the elimination of the regular tool joint and coupling shoulders. In 6⅛-inch or 6¼-inch hole drilled through 7-inch O.D. casing the use of 3½-inch internal flush joint drill pipe permits the use of the large 4-inch wire line core barrels with no increase in the outside diameter of the tool joints over the regular A.P.I. 3½-inch tool joints. In other words, the outside diameter of the upset is 4½ inches and the hole through the tool joint is 2¾ inches, which is the same as the hole through the pipe. This large hole reduces pump pressure and permits accurate slope testing inside the drill pipe. Recently our compauy had occasion to test a work-over well through this drill pipe since the screen had been set with this pipe and the well was not expected to be a big well. Since the pipe was internal flush the well was swabbed through the drill pipe without the necessity of running the tubing.

In the case of drilling to deeper sands where considerable drilling is to be done below the casing it is always advisable to pull the screen or liner or to sidetrack with whipstock except in cases where large full hole screen jobs have been set—then, of course, the back pressure valve is drilled out and the hole is full size immediately. If the hole is sufficiently large regular 4½-inch drill or 3½-inch internal flush drill pipe should be used and the well drilled in the regular way and screen set as usual in a new well. Of course, liner must at least be brought up into the casing with bootleg packer on top of the screen or full hole cement jobs with backing of tool may be used. The tubing may be set on the liner or hung in the screen as desired. Drill stem testing and Schlumberger are invaluable tools at this stage of drilling though no more important than good cores that will be obtained through the internal flush or 4½-inch regular full hole tool joint drill pipe.

In conclusion may it be said that perhaps the two greatest factors in successful resetting in old sands aside from the mechanics of fishing, handling pipe, the selection of equipment, etc., is, first, correct measurements, that is, knowing your hole and your pipe; and, second, the problem of mud plugging or drowning out of the sand through the use of improper muds. Muds of high colloidal content, low viscosity, relatively low gel strengths free of shales, ets., or preferably oil base muds or oil base mud substitutes should be and will be used more in the future.

Separator Installations Coming Into General Use

(Continued from Page 96)

might be an excessive vaporization of the saturated gas to pass off the top. If a greater pressure were maintained on the last stage than needed any gas held in saturation by reason of this pressure would escape in tankage.

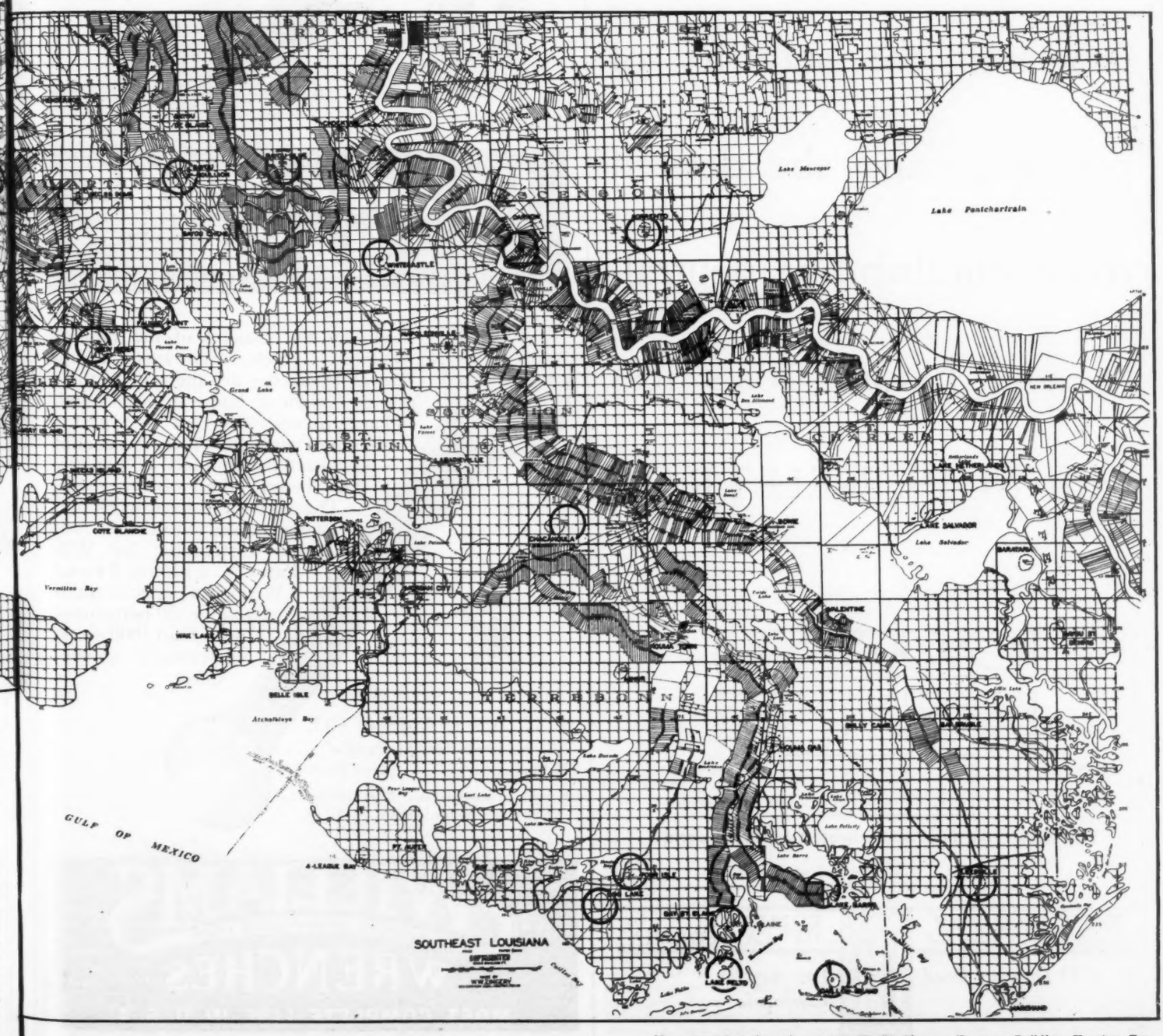
Under conditions typical of the majority of high pressure wet gas wells being brought in and in the use of three stage separator hook-ups, efficient results probably could be obtained by maintenance of a pressure of 450 pounds on the high pressure separator, around 250 pounds on the second, and around 75 pounds, depending on the pressure needed, on the third and last. Well pressures on production from the deeper horizons run from 2,000 to as much as 2,800 pounds.

In the earlier development of this type of gas production considerable trouble was experienced in separator installations due to freezing up of lines and valves, and even separators on cool days and nights. This trouble now is being eliminated on the coast by the use of bottom hole chokes in the wells, such practice permitting the expansion of the gas in the casing of a well instead of at the separator.

In the installation of multiple stage separation on the Gulf Coast there is no particular set practice. At Conroe, separators and field storage of a lease usually are centralized to accommodate a group of wells. At Port Neches in the one two-stage installation which has been made there the high pressure separator is at the well location while the low pressure unit is some 600 feet distant. At Louise there is a centralization of equipment.

CHICAGO ASSOCIATION OFFICERS

L. M. Foster, Lakeside Lubricants Co., was re-elected president and Lloyd Dilworth, Lloyd's Direct Service, secretary, at a meeting of the Chicago Individual Brand Petroleum Association, March 22. The organization is planning a fight against the Chicago ordinance assessing $35 per 1,000 gallon gasoline storage.



—Maps furnished through courtesy W. W. Zingery, Esperson Building, Houston, Tex.

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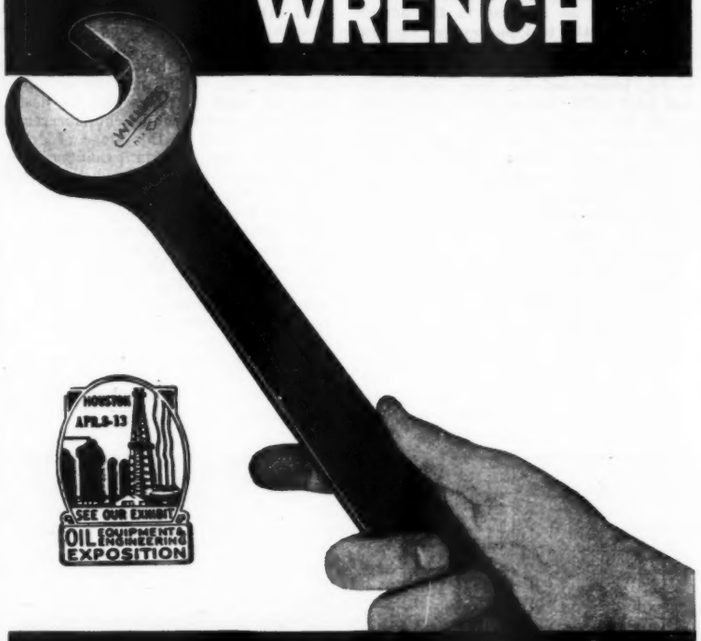

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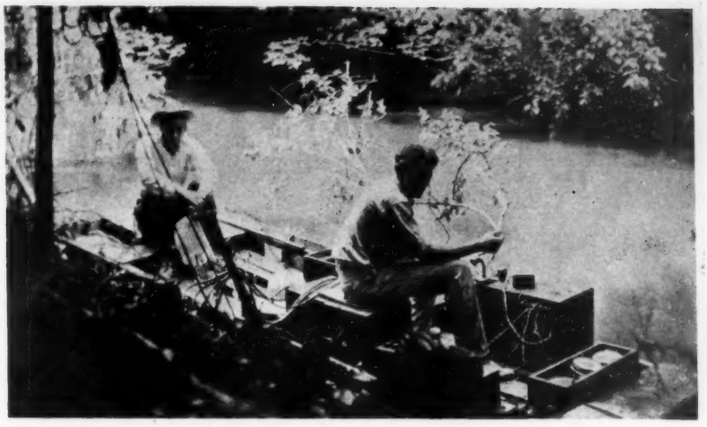
Reflection Shooting by Geophysicist on Progress of His Art

By ROBERT P. CLARK
Consulting Geophysicist, Houston, Tex.



Geophysical recording instruments set up on flat-bottomed boat on a Coastal Louisiana bayou. In the boat, waiting for the shot to be fired, are J. W. Flude and T. L. Howell

Geophysics, after a long period of laboratory and experimental travail, first startled the natives on the "banks of the bayou" in 1924. Charitably considered by the aborigines as species of harmless lunatics, small geophysical crews of three to five men, with many a Germanic curse, slopped about amid the festoons of Spanish moss to the delight of the countryside.

Because of the hundreds of feet of Beaumont clay overlying the subsequent beds, all except the most recent movements of the earth's crust were obscured. It was necessary to supplement the oil man's eye with instrumental help in determining the location of possible oil traps. Hence geophysics!

It was a strange business. The American executives of the major oil companies, half ashamed of sanctioning expeditions into the realm of black magic, shunted the bewildered foreigners and their only somewhat less befuddled American assistants off to the solitude of the coastal jungles with the consolation that at least it could all be charged off against income tax.

The forked peach twig gave way to the torsion balance and the seismograph.

A typical torsion balance organization of 1925:

Personnel: One very German (or Dutch or English) observer, one very collegiate American surveyor, and two very local ne'er-do-wells.

Equipment: One torsion balance, two model T Fords, one Fordson tractor, and one tractor trailer.

Production: One gravity observation per day (sometimes by the grace of God and a fast backfield, two observations per day).

Cost per station: Anywhere from $50 to $200.

A seismograph party of the same period:

Personnel: One bi-lingual party manager, one to three seismologists (assorted Europeans), three to five calculators (assorted Europeans), one surveyor (as per torsion balance party), three to five seismograph operators (of which the least said the better), three to five seismograph operator helpers, one permit man (who settled claims and bought 73 per cent of the turkey eggs in Matagorda County), one-half to 1½ dozen hole diggers (classify as railroad section men), one alleged telephone man, and last but not least, one shooting master.

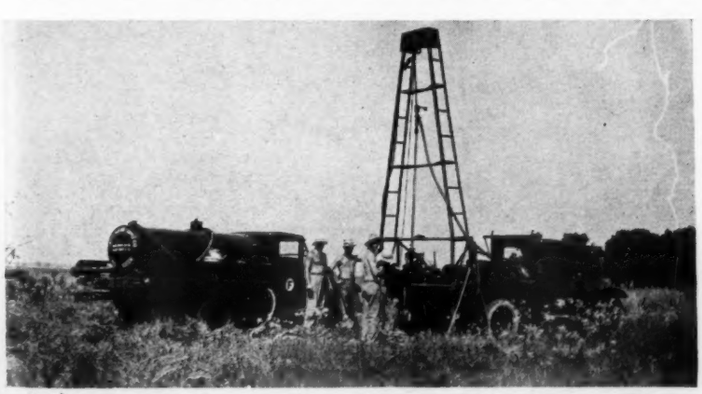
Equipment: Four (plus-minus) mechanical seismographs, enough automotive equipment to transport a medium sized carnival.

Production: Four to five shots a day (anywhere from 700 pounds to a ton of dynamite per shot).

Cost: Plenty.

The science was only learning to crawl. And crawl it did through knee-deep mud, to find production and justify its existence. The search was for shallow salt plugs. Geophysics found them. From 1924 to 1929 they found them all. The geophysicist changed from a cross between a magician and a gold brick salesman to an oracle whom none might dispute. True there had been many failures, but these had been offset by many successes. And after all, nothing succeeds like success.

Modern geophysical crews move in trucks such as shown above. Complete recording instruments are set up in these trucks



Drilling shot hole for geophysical charge. Complete equipment is mounted on truck. Although such depths are not drilled for shots, the equipment is capable of drilling to 2,000 feet. In geophysical shooting holes are drilled to 20, 30 or 40 feet. In many cases casing is run, and when the shot is fired another truck comes along and pulls the pipe

Gets Acclimatized

The party organization fluctuated and changed. The Wagnerian overtones receded and became mute. A strong Anglo-American influence predominated. The gay American surveyor grew older, balder and grayer. Those remaining outside the wall of a padded cell became party-chiefs, and some shed their chrysalis and ventured to become geophysicists.

The science discovered that of the shallow salt plugs varieties were infinite. Each configuration of outline produced a different geophysical result. They discovered that the steep-sided domes gave little or no "salt effect" (surrounding minimum) and that the tapering-sided ones did; that some domes had overhanging salt, and that while some domes had caprock, some did not. They discovered that the strange blanks on the time-distance curve occurred when the seismic energy emerged from the salt at an angle that dispersed it. In fact, by the time the shallow salt plug had lost its importance, they knew almost everything about it.

They discovered the quirks and peculiarities of their instruments, speeded up production and cut costs. Seismology underwent the greatest change with the introduction of the geophone. The dynamite shock was transferred to an electric impulse and amplified to the nth power. The mechanical seismograph became a museum piece.

The year 1927 marked the skyrocket rise of the magnetometer. In 1928 it came down like the stick. Measuring the variation of the earth's magnetic field, it was, because of its extreme cheapness and speed of operation, the answer to the oil man's prayer. Due to the same reasons it soon worked itself out of a job and Christmas of 1929 saw long lines of magnetometer operators waiting their turn at a soup kitchen.

Pseudo-Physicists

The same period witnessed the unwelcome intrusion of the pseudo-physicists. These supersalesmen, with the knowledge gained by some six months' exposure to the science as permit men, established themselves in the lobbies of our leading hotels and gave "hot tips" freely. They also had maps. Some of these were made from the memory of a squint at a company map, some were made from memory, and still others were just made. The dry holes drilled by the gullible on this type of information, if pulled up and stood end to end, would reach from here to some place much farther away. But the pseudo-physicist received a big play as his cost of production was nil and his information cheap. Natural attrition has thinned their ranks, but enough of them remain to make a trap for the unwary.

In 1928, while a great many eyes were squinting through the sand blasts of of West Texas, the Humble drilled-in Sugarland. This was a gravitational minimum which had refused to be checked by seismology.

Presto! Torsion balance is the thing; seismograph crews saw the gaunt spectre of famine leering over their shoulder. The year 1929 rolled around and Esperson Dome gave the torsion balance another boost while the "seismic cone of exploration" still refused to explore. On the theory that 1,000 feet of depth was reached for each mile separating the seismograph from the shot, the seismologists spread their distances and boosted their amplification and powder charge. Ten-mile spreads and 1-ton shots were used. The dynamite manufacturers basked in the sunshine of prosperity.

The Real Explosion

However, the detonation which occurred when the bill for the dynamite reached the Houston office, passed all records for explosions. This blast traveling deeper and deeper, bounced back off the basement complex and a new science was born, reflection shooting. The amplification hookup was modified. The spread pulled in to 1,000 feet and the dynamite charge cut to 4 ounces. Dynamite salesmen started wearing last year's overcoats, but the seismic boys wore a smile like a cat coming out of a cream cellar.

Of course the geophysical crews did not have everything their own way. The deep domes showed as fine a set of mysteries as could be imagined. Like their brothers the shallow domes, no two were alike and a little analogy became a dangerous thing.

Torsion balance technique changed and the averaging of gradients became accepted as orthodox and not heretical juggling of results. Reflection shooters discovered themselves divided into "corre-

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lators" and "dip shooters." Correlation is a beautiful thing in a country underlain at a moderate depth by consolidated beds, but in working through the conglomeration of sand piles and mud pies which go to make up the overburden of the coastal area, the reflections arrived in such a confused jumble that only a calculator of long experience and vivid imagination could correlate them. Shooting on a "phantom horizon" was developed. That technique is a success or a failure depending on whether the critic is "pro" or "con." In dip shooting the angle of bedding is the primary concern, with the depth from which the reflection emanates secondary.

Ghosts of Reflection

To add to the general festivities, the spectre of re-reflections rears its hideous head. A re-reflection is the ghost of a reflection. It may be something, or it may not. Experienced calculators, viewing certain reflection appearing and reappearing in identical repetition on a seismograph, felt the cold and clammy hand of doubt clutch at their hearts.

The question:

Is said reflection coming from 18,000 feet or has the energy bounced off a bed at 9,000 feet, come to the surface, bounced back to 9,000 feet to be re-reflected again to the surface?

The answer:

Quien sabe?

Some time after the day Montgomery-Ward dropped from 116 to 90 between sales, the pendulum apparatus entered the field. This equipment was as new as fresh paint to the oil industry and is still somewhat of a mystery. It consists, by way of broad general description, of a fused quartz pendulum resting on an agate knife edge (said knife edge being ground to the order of 1 micron). The pendulum oscillates through an arc of about 2 mm. The case is air-tight and evacuated of air to a constant low pressure. Electric wired jackets keep the apparatus at constant temperature. The instruments work in pairs, one remaining on a concrete foundation at the base station, the other taken to the field. Before starting, the rates of the two instruments are compared to within 1 part in 10,000,000. In operation they are released simultaneously (by radio) and the difference in rate recorded by radio on a tape, a-la-seismograph.

The gravimeter is also a newcomer. It consists, speaking rather generally, of a mass suspended by a fine spring. The greater gravity, the heavier the mass, the greater the pull on the spring, Q.E.D.

The gravimeter and the pendulum are more or less trade secrets and their successes and failures the closely guarded property of their owners.

About the same time as the rise of pseudo-physicists, a flood of trick geophysical instruments swept over the industry. True brothers of the forked peach twig, they would operate only for their owners. None, to the writer's knowldege, have gained a foothold of importance.

A Different World

During the late unlamented depression geophysics sank to a low ebb. A complete crew could be recruited in five minutes by walking down Main Street. However, with the first upturn of trade, geophysics picked up also. The men returned to a diffrent world from that of their previous incarnation.

Torsion balance crews now consist of about four instruments and from 9 to 12 men. The men are no longer bewildered. They are all boys who have been in the game seven or eight years. Production is around 300 to 400 stations per month. The cost is down to around $15 per station. The new and improved balances with even more speed and lower cost, are steadily gaining in favor.

The reflection crews are now shooting around 10 holes a day, said holes being largely machine dug to depths of 60 to 120 feet. This shot hole drilling, by the way, is on the road to becoming a science of its own.

The following is a sketch of the geophysical operations in the coastal area at the present writing (mid-March). "While these figures are not guaranteed, they are from sources which we believe to be reliable."

Company—	Torsion balance	Pendulum	Reflection	Magnetometer
Gulf	2	2	2	0
Stanolind	5	0	1	0
Amerada	0	0	4	0
Magnolia	2	0	1	0
Continental	0	0	2	0
McLean	0	0	1	0
Shell	8	0	3	0
Humble	4	0	5	3
Texas	1	0	5	0
Scranton	0	0	1	0
Superior	0	0	1	0
Pure	0	0	2	0
Republic	1	0	0	0
Salt Dome	2	0	0	0
Atlantic	3	0	0	1
Barnsdall	0	0	1	0
Sun	1	0	2	2
Tide Water	0	0	1	0
DeGolyer	0	0	1	0
Navarro	0	0	1	0
Sterling	1	0	0	0
Total	30	2	34	6

Contractors having two or more parties in the field: Texas-Louisiana, Independent, Hord, G.R.C., G.S.I., Schlosser, and Clark.

Work is being done in the following:

Louisiana, parishes: Arcadia, Calcasieu, Cameron, Evangeline, Iberia, Jefferson Davis, Lafayette, Livingston, Point Coupee, St. Helena, St. Landry, St. Martin, Vermillion, and Assumption.

Texas, counties: Chambers, Fort Bend, Hardin, Harris, Jefferson, Brazoria, Calhoun, Liberty, Newton, Orange, Victoria, Refugio, Wharton, Bee, Brooks, Frio, Goliad, Gonzales, Guadalupe, Hidalgo, Jim Hogg, Karnes, Kleberg, Milam, San Patricio, Starr, and Nueces.

Recapitulation

To recapitulate:

In the early days geophysical crews

Portable machine devised by members of the staff of Independent Exploration Co. for digging holes in which to place shots for geophysical work. The machine is capable of drilling to 20 feet. Operating this machine are A. A. Hotard (left) and L. E. Meitzen

sought shallow salt domes. They found them.

In the recent past geophysical crews sought deeply buried domes. They found them.

A few words as to the future. Of course there are other worlds to conquer. The entire drainage of the Mississippi will be worked (by our grandchildren perhaps); Florida and the East Gulf Coast will be thoroughly worked. But what of the old Gulf Coast? The old Gulf Coast will see many a field of the Hastings-Bosco type. A new line of geophysical reasoning is in formation. The gravitational proponent and the seismic enthusiast must come together for close co-ordination. They must, instead of glaring at each other like the Guelfs and the Gibbollines, come to see each other as a very necessary cog in the exploration machine.

Tactics and technique will change. They are changing as these lines are written. New instruments will appear. At first they will be hailed as the solution to all equations. Secondly, after trial they will be cursed as junk. Finally these new instruments, then old, will fall into their proper slots to function with the rest of the machine.

What will these instruments be? Well for a guess, electrical methods. That is not new, but a successful application would be. For another guess, radio. As to the form that may take, ask the man who has tried it. Perhaps other methods, now not even guessed at, will evolve.

But in the future, as at the present or in the past, the value of any method or instrument will be the direct function of the ability and integrity of its operators.

Methods of Pumping in Gulf Coast Area Vary

(Continued from Page 87)

compression of the gas is calculated around 4 cents per 1,000 feet.

The new gas lift installation with three wells is operated with another compressor, also electrically driven. This compressor has a capacity of approximately 675,000 feet daily although only around 400,000 feet is needed to operate the lifts. This installation has doubled the production made by these wells by conventional pumping. Although gas from the field system was drawn on to kick the lifts off, 600 pounds pressure being needed for this purpose, wells on this hook-up also now are producing a surplus for operating, leaving part of the gas production to be turned back into the field system. In some instances as little as 50 feet per barrel of oil lifted is needed to operate a lift, which with the 150 to 250 feet per barrel in the oil itself that is recovered, the operation of the installation is a continuous, self-operating process. The lifts work at pressures as low as 280 pounds.

Another form of gas operated lift which is being used in several instances on the Gulf Coast is the Sullivan pneumatic cylinder. While this does not eliminate the necessity of rods and the conventional working barrel and standing valve of conventional equipment, it does eliminate the necessity of surface power by utilizing gas and has filled a desired purpose of more economical lifting cost.

The first installation of the Sullivan unit on the coast was at Gueydan, Vermillion Parish, Louisiana, by Pure Oil Co., the owner and operator of that field. Installations in this field are known as the 7-inch type, which with the 6-inch size, the most common being used generally at Van, where this type of pumping is most prevalent, and which is adaptable on wells up to 5,500 feet deep.

Installation at Louise

At Louise, in Wharton County, coastal Texas, Pure Oil Co. has made installation of the 10-inch size, the largest type, and which is operative on wells as deep as 8,000 to 9,000 feet. A few of this size are in use in Oklahoma City. Gas for the operation of the Louise installation is taken directly off the high pressure line from the separators. Approximately 250 pounds pressure is required. However, as ample pressures and volume of gas are available from other wells no compressors are needed. The gas is returned to the field system without loss so the cost of operation of the units is limited to repairs and any replacements that might be necessary in the equipment.

Of interest also is the fact that these units can be operated without the customary heaters. The plentiful volume of gas at Louise makes expansion of volume by heating unnecessary and at the same time this gas is sufficiently warm that no tendency to freeze has been indicated.

Another installation of the Sullivan pneumatic cylinder recently was made by the Texas Co. at Manvel, Brazoria County.

Fluid Levels Stand High

Generally speaking fluid levels on the Gulf Coast stand higher than in fields of most other areas, this being attributed to the greater hydrostatic head which is the major source of productive energy. For the most part wells do not pump off as in other areas although they can be taken by water which accumulates if not taken off, trapping the oil. To keep ahead of this water and to increase the percentage of oil recovery some operators have resorted to the use of 4-inch barrels as against the usual size of 3-inch and smaller. However, it generally has been found that any benefits from increased capacity of the 4-inch barrel are offset by the greater amount of shutdown time because of breakage of equipment occasioned by the greater loads, and that over a period of a month production with the smaller barrels is larger.

In pumping on the Gulf Coast by conventional methods long, slow strokes generally are considered the most efficient as breakdowns and repairs are less in such operation. In line with the unusually high fluid levels which prevail on the coast pumping is at comparatively shallow relative depths. This facilitates the lifting of the fluid. There are a number of instances of wells on the Gulf Coast with low fluid levels but for the most part these wells are small and generally are pipe line oil producers so that the loads are not unusual. In setting, it is prevailing practice not to attempt to take in too much fluid as setting deep tends to agitate the fluid to such an extent that water is increased.

Tapered rods have been tried out by a number of operators but the increased diameter of these rods was found to have increased the friction of movement that power requirements resulted.

Repressuring Projects

Several repressuring projects are being carried on in coastal fields, among which are those of the Humble Oil & Refining Co. at Sugarland and Raccoon Bend, and those of the Rio Bravo Oil Co. at Saratoga, and the Union Sulphur Co. at East Hackberry. Gulf Coast fields as a whole have never been adaptable to repressuring due to the fact that around salt domes the sands usually are broken and faulted too much. The producing horizons of Sugarland and also Raccoon Bend, however, are of the blanket type and more uniform, and repressuring has proved entirely successful. At Saratoga, Rio Bravo Oil Co. is repressuring two different shallow horizons in which the sands extend fairly uniformly over certain areas, and material benefits have been derived from the undertaking. The Union Sulphur Co. project is confined to a small area on the northwest side of the dome, where gas production is being returned to the sand through a key well.

The Texas Co. has just started a repressuring project in the Escobas Field, Zapata County, in the Laredo district of Gulf Coast South Texas. The company also is using a number of gas lift devices in this field and also in a few other places.

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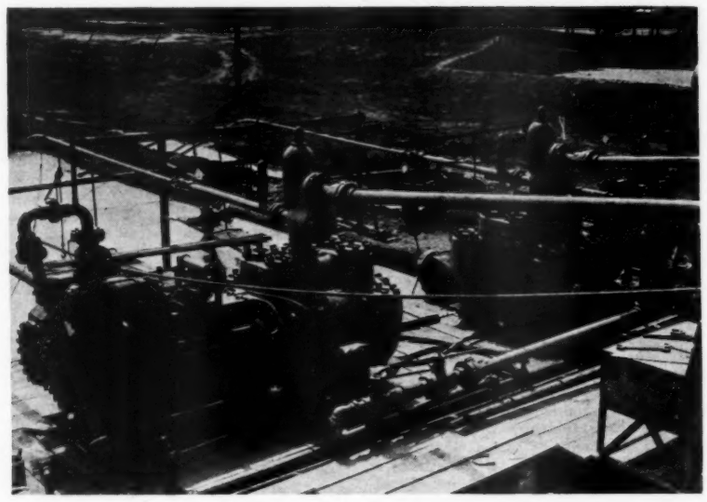


A pair of 20-inch Super Wilson-Snyder slush pumps installed on a Gulf Coast location, showing some of the manifold connections. Pumps such as these provide ample volume and ample pressure to handle almost any condition that may arise in a well drilling job in this area

Rising grotesquely above their comparatively level surroundings in several areas of the Gulf Coast, starkly barren of any verdure, their gaunt sides lined and seamed by erosion, stand several sand and clay monuments attesting the power and destructiveness of drilling wells which have escaped control. They are the outer shells of extinct, or semiextinct well craters. Standing 50 to 80 feet above adjacent fields, they graphically depict what may happen to any drilling well in the Gulf Coast as a result of a moment of incautiousness, or as a result of inadequate preparedness to control whatever pressures may be encountered, at any depth. At White Point near Corpus Christi; in the Saxet Field near the same city; at Greta Field, in Refugio County; and in numerous other localities these miniature mountains whose craters enclose miniature lakes, are among the most bizarre objects on the Gulf Coast landscape. Numerous other craters, wrecked graves of once potential oil wells, spent their fury hurling oceans of water from subterranean rivers and have left but gaping holes, frequently as much as 150 to 300 feet across, to mar the surface of the earth.

In the final analysis, these evidences of man's loss of control over the pressure against which he is working represent effects rising from one or more causes, to wit: (1) Incautiousness, or relaxed alertness on the part of the drilling crew; (2) inadequate drilling fluid, lacking in proper weight, viscosity and other characteristics required for maintenance of control; (3) inadequate surface control equipment, or, and this is most important, improperly maintained surface control equipment; (4) weak links in otherwise adequate and carefully selected surface control equipment; (5) incautious coming out of the hole; (6) conditions against which operators are powerless, such as cratering around the outside of surface casing.

No operator is proud of a blowout. More, perhaps, than the cost in dollars and cents is the cost in chagrin, mortification and self-reproach. Wisely, the Gulf Coast section of the industry, while recognizing, the inevitability of occasional blowouts in high pressure areas, chalks up no credits to the field superintendent, the tool pusher or the drilling crew which permits a well to get out of hand. In the six primary causes of loss of control of drilling wells, mentioned above, a majority of Gulf Coast operators will agree that their blowout troubles in the past are included. Anyone who has followed the history of blowouts in the Gulf Coast in the past three years can name one or more wells which got out of control for one or more of the reasons cited.

Drilling Fluids

Until a string of surface pipe can be landed and cemented, entire reliance for control must, of course, be placed on drilling fluids. Normally in the Gulf Coast surface hole is quickly made without undue regard for carrying heavy or specially treated drilling fluid. Completion of 1,200 to 1,500 feet of surface hole in two or three days is commonplace. This is true both of wildcats and of wells in proven areas which have been drilled without blowout mishaps.

In areas such as existed in certain sections of the Conroe Field, where an inadvertent blowout caused heavy surcharging of upper water sands under a tract of several hundred acres, mud used in drilling the surface hole must be heavy and constantly checked to maintain essential characteristics. In proven areas such as this, typical of which is the south end of the Saxet Field, and the McFadden Field in Victoria County, it has not been unusual for the most carefully drilled wells, even after surface casing had been set and cemented to the top, to start cratering around the outside of the surface pipe. This is caused by gas pressure of sufficient force to penetrate up through the loose, unconsolidated formations characteristic of the Gulf Coast. Usually such pressures are from shallow water sands surcharged with gas from lower sands as a result of one or more blowouts. In case of a well starting to crater around the outside of the surface casing, the operator's only alternative is to attempt to mud off the sand around the outside of the casing by means of heavy drilling mud, the heavier the better. If the weight of the mud, mixed as heavily as possible, fails to exert sufficient hydrostatic pressure against the surcharged sands to subdue them, then the battle is hopeless. Frequently, indeed, it is hopeless from the outset because of the speed and force of the blowout. The battle then becomes one of attempt to salvage as much of the rig as possible.

Occasionally these surcharged upper sands, in addition to carrying relatively high gas pressures, also contain floods of artesian water and floating sand, necessitating continuous attention to maintenance of drilling fluids of proper consistency. Instances have been recorded in drilling Gulf Coast wildcats where artesian water sands carrying no gas pressure have chased the drilling fluid completely out of the hole and sanded to the top from levels as deep as 300 to 400 feet. Such a case was that of a wildcat drilled within 10 miles of the Conroe Field, although it should be stated that heavier pumps and availability of equipment for mixing mud at the surface would have permitted control of the artesian flood.

In Conroe Field

Several drilling wells which got out of control in the Conroe Field produced such volumes of water that the gas pressure at the surface was considerably below the pressure in the surcharged sands. One Conroe well which got out of control was drilling under a wood derrick. Due to cause number three, previously enumerated, the well blew out while surface plugs were being drilled. Discharge at the casing was estimated to be at 200 to 300 pounds pressure. The gas ignited, but the rivers of water which accompanied the gas prevented the wood derrick from being more than slightly charred in places. Water finally extinguished the fire entirely, and the well was easily capped. The same derrick, with slight additional bracing, was subsequently used to complete the well.

The Saxet Field near Corpus Christi is another field in which upper sands have been surcharged by former blowouts and where surface hole must be dug with exceeding care. The McFadden Field, near Victoria, presented a similar problem. At best, in an area of this nature, surface hole digging is an extremely ticklish proposition. Just how ticklish it is may well be illustrated by the strategy resorted to by one major company which drilled, or undertook to drill, an offset to a crater area in Conroe. A special highly unitized rig was set up on the derrick. Caterpillar tractors were then attached by heavy cables to these unitized sections of the rig, and tractor operators were instructed to stand by in shifts. Surface hole was started in big-inch series, and shortly after the first short string of 20-inch pipe had been set and cemented the hole started slowly to kick around the outside of the surface string. In a very few minutes the principal units of the rig were yanked off the derrick floor and pulled out of danger by the heavy tractors. This well was finally completed after the surface sands had been bled by shallow wells dugs for the purpose, and the crater area quieted down.

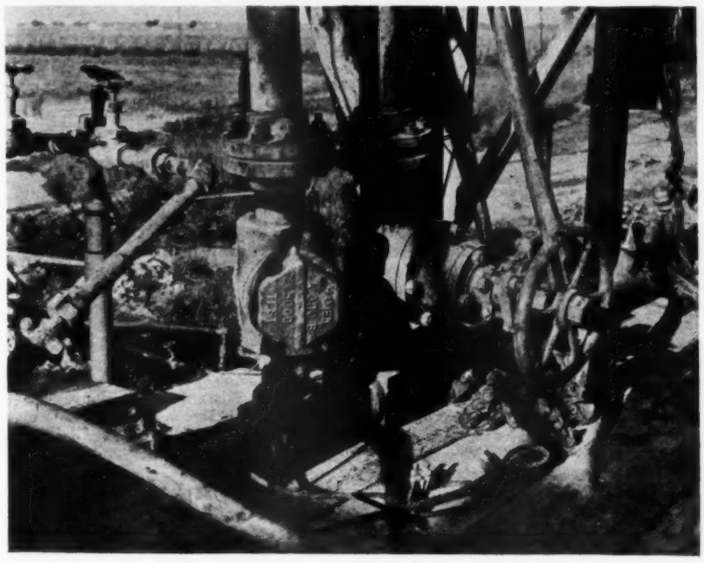
Casing Program

The usual practice, in areas where surcharged upper sands are likely to form a hazard, is to set the first string of large diameter surface pipe at from 200 to 500 feet, care being exercised to cement this string from bottom to top to provide maximum shut-off in the unconsolidated formations, and the greatest possible hold-down weight against pressures which threaten. In the so-called crater area of Conroe, during the drilling of that field, the Texas State Railroad Commission ordered the following casing program: "The casing program of all wells hereafter drilled within a radius of three-fourths of a mile of any well blowing out or having blown out shall include three strings of pipe of which the first two strings shall be placed in accordance with the following program: (1) A minimum of 350 feet of surface casing, or an amount sufficient to penetrate the first series of water sands, shall be set and cemented with sufficient cement to fill the annular space back of the casing to the surface of the ground or bottom of the cellar; (2) a minimum of 1,400 feet of casing shall be run and cemented with sufficient cement to fill the annular space back of the casing up to the preceding string of casing." The customary casing program in the Conroe crater areas was: 350 feet of 15½-inch; 900 to 1,400 feet of 10¾-inch, and an oil string, 5,000 feet or more, of 7-inch casing. An alternative program used by some operators was: 13⅜-inch, 9⅝-inch and 7-inch. The former provided greater clearance between casing strings which, due to the use of heavy muds that cause thick walls, is more essential from the standpoint of successfully maintaining circulation and assuring good cementing jobs, than in other areas.

A similar order by the Texas Railroad

A blowout preventer hook-up on a Gulf Coast well, showing to the left the high pressure check valve and gate valve through which mud may be pumped in case of necessity to mud up a "kicking" well. This type of preventer made by Oil Center Tool Company, Houston, Texas

Commission prescribed three strings of casing for the Greta Field, where within two weeks after the discovery well was completed, a well being drilled a mile east got out of control while drilling in sand at 2,115 feet. This well soon cratered, swallowed the rig and derrick, and caught fire. After a week, with a crater 150 feet across, the pressure subsided and the fire was extinguished. The following week a well being drilled 900 feet southwest of the original producer, blew out while drilling around 2,600 feet. This well at first blew through the 10-inch surface casing cemented at 898 feet, but subsequently broke around the outside of the casing, cratered and caught fire. At the time of this blowout, E. H. Buckner's No. 1 O'Brien, a southwest offset, was nearing the pay horizon at 4,400 feet. A string of 7-inch casing, which fortunately happened to be on location, was quickly run into the hole and cemented at 4,345 feet. As indicated by a subsequent recording of 500 pounds pressure between the surface pipe and the 7-inch, the prompt action of the operators doubtless saved this well.



Typical double standpipe hook-up in the Gulf Coast which provides an extra margin of safety in case of necessity to cut out regular standpipe for repairs

On McFaddin Ranch

The Texas Co.'s experience with drilling shallow gas charged sand on the McFaddin ranch, near Victoria, Victoria County, has added a significant chapter to the book of the industry's knowledge of drilling under such conditions. The first test in this field was a dry hole at 6,684 feet. No. 2 McFaddin, at 2,025 feet, blew out of control but was later completed as a gasser through the drill stem. The third test got through the dangerously charged upper sands and was completed as a producer at 5,835 feet. This well later declined in production, was deepened to 7,000 feet, and abandoned as dry. The fourth test blew out at 2,840 feet and after a lengthy battle for control the hole was finally junked and abandoned with drill stem in it. The fifth test negotiated the shallow gas sands successfully, but was abandoned as dry at 4,970 feet. The sixth test drilled to 3,047 feet, almost through the danger zone, when it blew out and cratered, swallowing rig and derrick. It ran wild for a month and died only when it bridged itself. The seventh test was spudded about the time No. 6 blew out, and got only to 1,176 feet when gas presumably migrating through shallow sands from No. 6 McFaddin, broke out around the surface pipe and cratered the hole, with loss of derrick and rig. A relief well on the edge of No. 6 McFaddin, drilled with Sheldon-Burdon pressure control rotary equipment, successfully landed and cemented the following pipe: 217 feet of 16-inch; 581 feet of 13⅜-inch, and 1,917 feet of 9⅝-inch. This relief well fought pressure continuously. A relief well for No. 7 McFaddin was also successfully completed with pressure control equipment of the same kind, and the two relief wells are credited with considerable effectiveness in subjugation of the unruly craters. Convinced of the practicability of pressure drilling equipment as a valuable aid in handling wells in the area, the Texas Co. then installed a Hydril pressure control rig and successfully completed No. 8 McFaddin at 6,459 feet, where it was abandoned as dry. The same rig was then moved on to No. 2 McFaddin, previously completed as a gasser with drill stem in the hole, and this well has since been completed as a producer. The same rig is now starting No. 9 McFaddin. In No. 8 McFaddin, 232 feet of 13⅜-inch casing, followed by 1,019 feet of 10¾-inch pipe was set. Perfect control was maintained in subsequent drilling, and 8⅝-inch casing was set at 3,426 feet. Hole was drilled to final depth without additional casing. Much credit for success in drilling No. 8 and No. 9 McFaddin wells without mishap has been ascribed to the maintenance of back pressure on the hole by restricting mud discharge from the casing by suitably sized chokes. This is made possible by drilling control equipment which permits the round kelly joint to be packed off at all times.

Detailed Regulations

It is impossible, in the drilling of Gulf Coast wells in high pressure, or potentially high pressure areas, to place too much emphasis on the importance of maintaining drilling fluids of approved characteristics. In some Gulf Coast fields, to assure against incautiousness in this respect, the Texas Railroad Commission has deemed it advisable to prescribe detailed regulations, as for instance, Rule No. 22 in the Greta Field special order dated June 23, 1933: "After any well has been drilled below the shoe of the 1,300-foot string of pipe, the mud condition shall be checked after every break in the formation. Below a depth of 1,800 feet the mud weight shall be kept at a minimum of 11 pounds per gallon, and the viscosity of the mud shall not be less than 33 nor greater than 55. Viscosity shall be measured against water flow through a funnel type viscosimeter."

In the light of extensive research work conducted for the past several years as regards drilling fluids, and the persistent experimentation and discussion of mud characteristics looking toward increased knowledge concerning its mixture, control and use, almost all operators are keenly conscious of the mud problem, and endeavoring to keep abreast in approved mud practices. Even the hardened school of early Gulf Coast well diggers, previously contemptuous of all forms of "mud-daubers," are acknowledging the importance of drilling fluids, and posting themselves as best they may. Several articles in this issue of The Oil and Gas Journal deal analytically with theories, practices and experiments pertaining to drilling fluids, which are now occupying the attention of the engineering departments of many operating companies.

Surface Control

Supplementing, and of only slightly less importance than the mud problem in drilling in high pressure areas in the Gulf Coast, is the question of surface control equipment which constitutes the first, and usually the last, line of defense against blowouts should drilling fluids fail in their function. If surface control equipment fails, what was a drilling well becomes another job for the wild-well fighters.

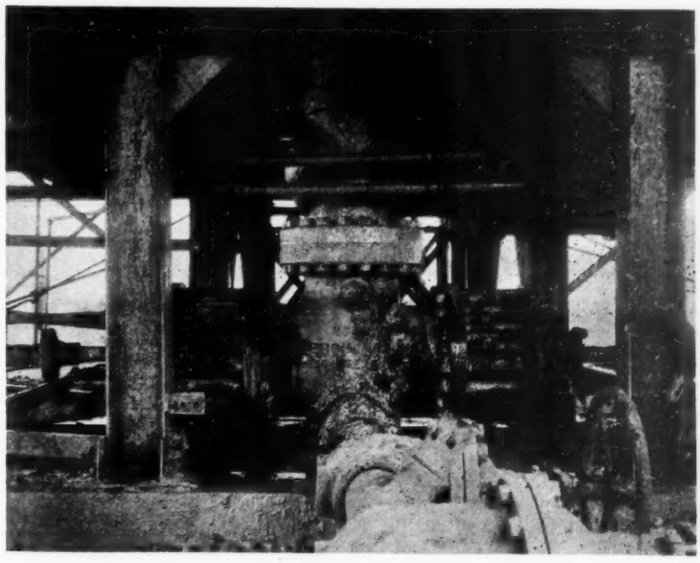
Recognition of this fact is clearly evidenced in the rig set-ups today being made in the Gulf Coast. Starting as far back as the boilers, every detail of the set-up reflects continuous consciousness of the necessity of guarding against mishap. Boilers themselves, in accordance with time-honored traditions, are customarily placed to the windward side of the rig to minimize the possibility of escaping gas being ignited by boiler fires. On almost all Gulf Coast set-ups in use today, three boilers are used. Working pressures are 250 or 300 pounds, and horsepower ratings will be 75 or 100 for each boiler. The use of three boilers assures adequate steam for all operations, and in addition provides sufficient steam for routine operations should one boiler have to be cut out for repairs.

Shutdowns for lack of steam, resulting in stuck drill stem or slowed-down pumps in an emergency, are rarely heard of today. An occasional boiler blow-up will disrupt things once in a while, but the increased use of low-water regulators of special design for oil field use, plus the employment of much more elaborate boiler firing systems, has reduced boiler shutdowns to a low minimum.

Steam lines to pumps, drilling engine and rig floor are, as a general practice in the Gulf Coast, being planned and laid with engineering nicety, and with a view toward eliminating not only all annoying and wasteful steam leaks, but also toward assuring no interruptions in operations from this source. High pressure, quick-connection unions, usually of 1,500 to 3,000-pound test, are used extensively. Several of the unions which have gained substantial popularity for this service in the past year or two are fitted with only one bolt, permitting quick set-up and tearing down. Steam leaks around the better class rigs in the Gulf Coast are distinctly frowned upon.

Slush Pumps

Until the past several years, during which Gulf Coast wells have averaged much greater finished depths than was believed possible five years ago, slush pumps were installed with no particular aim in view other than for furnishing circulating mud. Usually the discharge connections were brought together in a single line leading to the standpipe, where a single stand-pipe valve did its duty. Today, however, it is rare to see a slush pump installation that is not ready for instant compounding. On tests where extremely high pressures are being provided against, it is becoming customary to install a reserve standpipe for emergency use. Complex pump manifold, making adequate provision for the application of hydraulic pressure in emergencies to hydraulicly operated blowout preventers, pressure operated master gate valves and flow line valves, and providing lines connected through check valves and high pressure gate valves for purposes of pumping heavy mud below the blowout preventers into the casing, are all installed in advance of spudding in. They are connected as quickly as surface casing has been set and cemented, blowout preventers and other control equipment being installed during cement time. Numerous standardizations of slush pump manifold systems have been worked out by major and independent operators, and a close check of almost any of them reveals that nowhere has contempt for high pressures been allowed to spare expense in making the control hook-ups.



Typical heavy type blowout preventer installation in a high pressure Gulf Coast area. Cameron pressure opening and closing ram type preventer on the casing, with a Cameron pressure closing master gate valve flanged above. This is one of the newest hook-ups in use in the Gulf Coast. Equipment furnished by the Cameron Iron Works, Houston, Texas

Several typical hook-ups are illustrated in this discussion of the subject. To facilitate setting up and tearing down of the rig, welded manifold units, connected with quick-acting one-bolt unions, are coming into the picture extensively. The Texas Co., on a deep test at Freeport, has recently installed a pump manifold which reflects considerable thoughtfulness in design and construction. All parts are of high test material, and wherever possible permanent joints in manifold units are joined by welding. This is an example of a manifold which will probably never give trouble through failure at any point, and which, because of its design, should outlast many wells.

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it is impractical to employ drill stem float valves or back pressure devices designed to prevent high gas pressures from unloading the drilling string while connections are being made, or while the kelly joint is in the rathole for any reason. As a substitute, however, almost every Gulf Coast rig is equipped with a heavy hydraulic nipple, fitted with tool joint pin on the bottom, and a high pressure gate valve on top, designed for quick-stabbing in the tool joint box up in the rotary should the well attempt to kick in through the drill pipe.

Much of the potential danger of a well blowing in through the drill pipe, after the preventer has been closed around it in case of an attempted blowout, has been reduced by the use of rotary hose of continuously higher test ratings. Hose couplings, too, have been improved and strengthened accordingly, and assemblies of 4,000, 5,000 and 6,000 pounds test are commonplace. Cautious operators, however, perhaps remembering instances of rotary hose flying wildly in the air, flailing the derrick to splinters after breaking loose at the standpipe, still regard the use of a high-pressure valve or stop-cock between the swivel and the hose a wise investment.

Plug-Valves and Stop-Cocks

The necessity for quick handling of slush manifolds, and their related rig members, has doubtless stimulated the now very extensive use of plug-valves and stop-cocks in the makeup of these manifolds. The facility with which these devices may be opened or closed with a quarter turn, and their resistance to cutting out because of inherent design, make them highly suitable for the work. For the same reasons, they are widely employed in the assembly of blowout preventer connections, sizes up to 7-inch being used.

Increased respect for high pressures encountered in Gulf Coast wells as their average depth increases, and taps over higher bottom hole pressures, has taken Gulf Coast rigs off the grass and raised them sufficiently high for easy installation of adequate blowout preventor equipment. As recently as the case of the discovery well in the Buckeye Field, which blew in through the drill stem, was the impracticability of low derrick floors again demonstrated. In this case the derrick was not more than 3 feet above the ground level, and as the space under the derrick was crowded with sills and cribbing, no room was available for working under the derrick in attempting to regain control of the well. Operators who grew up in the Gulf Coast frequently have been minded to wonder how they ever "got away with it" in looking back over the methods of a very few years ago.

In almost all instances, derricks are now built on substructures as much as 16 feet high; and the usual practice is to dig a cellar for providing additional room for surface pipe control equipment. This, however, varies with the individual ideas of various operators, some of whom prefer to have all connections above the ground level, and raise their derricks accordingly.

It is characteristic of Gulf Coast wells that, once the drilling fluid is unbalanced by formation pressure, the hole will be unloaded in an amazingly short period of time. Largely for this reason the trend in selection of blowout preventors has been toward those operated by pressure, with control valves placed within easy reach of the driller. Their advantage lies in their speed of operation which, because of the rapid cutting action of sharp sands almost invariably accompanying blowouts in this area, is highly desirable. Delayed action may mean increased hazard to the drilling crew, and may mean damage to sealing or closing-off elements sufficient to render them incapable of holding, in which case the well gets loose.

Master Gate

Many Gulf Coast operators install a heavy master gate on the surface casing, with flange connections above for the installation of blowout preventer. The theory behind the use of a master valve is that, should everything else fail, it can be closed and the well shut in. This can not be done, of course, if there is drill pipe or tubing in the hole, but frequently these can be dropped, if necessary due to failure of blowout preventers for any reason, and the valve closed. Loss of a string of pipe, and potential loss of a drilled hole through inability to pull corkscrewed pipe, is rated less than the possible cost of a cratered well, frequently involving the loss of the entire rig, except boilers.

If a master gate valve is not used, then blowout preventer is screwed or flanged directly on to the surface pipe. In a majority of cases, ram type preventers are used as first line of defense, principally because of their susceptibility to quick closing by steam, air or fluid pressure, and secondarily because they provide a large measure of security against the pipe being blown out of the hole. Visitors who looked agape at the drill stem artistically draped in the majestic oaks at McFaddin's ranch following a blowout; or at the grotesque steel streamer twisting over the landscape at Thompsons following a blowout and crater in that field, can visualize the operator's pleasure in contemplating the arresting action of steel rams, provided they are closed early in the game. Once a long string of drill pipe has gathered momentum out of the hole, its sheer weight makes it almost impossible to stop by mechanical means.

As a secondary line of defense, and to provide a final seal around the drill stem, it is customary in the Gulf Coast to install an auxiliary blowout preventer of the Hosmer type. That this practice has proved wise, an unnumbered host of Gulf Coast wells, now quietly producing their allowances at pressures ranging from 1,500 to 3,000 pounds, attest. Even a small leak in the packing of a preventer frequently has been known to prove fatal, owing to the quick-cutting action of sand bearing fluids, and the sand-blasting effect of sand-carrying gas. As a consequence, double preventer installations very largely are used, and provide extra assurance at very low cost against loss of a well in which any sum, $25,000 to $75,000 may become invested.

Blowout Preventers

In shallow well areas, in areas where high pressures are non-existent, and in some proven fields where producing gas and oil horizons are well known many operators place their reliance on well conditioned drilling fluid and a single Hosmer type preventer. The word Hosmer has come to signify a preventer, the body of which screws or flanges on to the well casing, and the packing element of which may quickly be latched around the drill stem below the kelly joint. The drilling string is then lowered until the packing element seats in a taper in the upper part of the body, and the weight of the drill stem is utilized to expand the packer seal off between drill pipe and casing. Once the packer is seated it is mechanically locked against being blown out of the body, and several variations of this type of head permit the locking ring or flange to be screwed down to keep packer expanded regardless of weight of drill pipe. An interesting and popular model of the Hosmer type preventer, made by J. H. McEvoy Co., Houston, utilizes a pressure operated mechanism to effect almost instantaneous latching of the packing element around the drill stem. Packing element is made an integral part of the preventer body and latching mechanism, and is automatically applied below the derrick floor. The conventional type Hosmer preventer is designed for manual latching of the packing element, by members of the crew, on the derrick floor. Hosmer type preventers enjoy the confidence of many operators because their design permits the use of a heavy rubber packing element, susceptible to considerable expansion, which since rubber flows under pressure, provides for tight sealing even though slight damage may have been done to the preventer by sand cut-

ting, denting by flying metal, or other mishap.

Continuous improvements have been effected in blowout preventers of all types, and the stiff competition among designers for dominance in the field promises interesting developments for the future.

Drilling Equipment

Due to the growing list of successful drilling operations conducted in high pressure areas with rotary equipment designed to permit drilling under pressure, it seems likely that the future of this type of equipment in the Gulf Coast is bright. In this type of drilling equipment, means of preventing blowouts are incorporated in the rotary machine, or, rather below it. The Hydril machine provides a means of maintaining pressure on the formation constantly, and supplementary, pressure-operated blowout pack-off means should the former fail for any cause. The Sheldon-Burdon Co. has also contributed some exceptionally successful machines of this character to the industry, many of which have been used in exploring high pressure areas. With this type of equipment, it is possible and practical to supplement the weight of the drilling fluid with pressure exerted by the slush pumps. This is accomplished by installing chokes on the mud flow lines having a smaller discharge capacity than the input of the mud pumps. A back pressure results which, in drilling in dangerous areas, has proved of considerable value. One effect of maintaining a back pressure on the formation being drilled is to drive some of the drilling fluid back into the formation, effecting a clogging of the pores which assists in control of pressures. The experience of the Texas Co. in the McFaddin district has left records which are self-explanatory.

As in the case of slush pump manifolds, blowout preventer hook-ups have undergone decided evolution as the need for more positive and swift control has been experienced.

When Hosmer type preventers alone are used, especially of the manually operated type, connections are relatively simple. Late practice adopted among a number of operators dictates the use of high pressure line and connections leading into one casing outlet of the preventer, a heavy check valve with gate valve ahead being used close to the preventer to prevent circulating fluid pressure being overcome by formation pressure. A second high pressure line, also fitted with one or more high pressure gate valves or plug type cocks, is laid from the preventer to the ditch. This line is normally left open, with a view of providing an outlet for drilling fluid from the top of the preventer body when the packer is set down. After packing element has been set and locked in the body, these valves or cocks may then be closed. Slush flow from the well during normal operation is over the top of the preventer body. Mud circulating line, and relief line, are customarily of 2-inch or 2½-inch diameter, high test pipe and connections being used on the theory that a chain is no stronger than its weakest link.

More Elaborate Hook-Up

Pressure operated ram type preventers require a more elaborate hook-up, especially when a Hosmer type preventer is installed above. These hook-ups have been more or less standardized by individual operating companies, and several typical types are shown herewith. In most of the hook-ups in general use, provision is made for closing of pressure operated preventers either with the boiler feed pumps, or with the slush pumps. In the case of one major operator, at least, a separate boiler feed pump, located on an extension of the drilling floor, near the driller's position, is installed with each rig for the sole purpose of handling hydraulic operated safety equipment. Provision is made, of course, for operation of preventer equipment with slush pumps in case of failure of the special unit.

It is tradition in the Gulf Coast that most wells "kick" or get unbalanced while coming out of the hole with the drill pipe. The tradition is amply supported by a long list of case histories of blowouts. Despite cautious withdrawal of the pipe, temporary shutdowns to permit fluid inside the pipe to balance with that in the main hole, and other precautions, a swabbing action is all too frequently imposed which causes a blowout. This may occur when the pipe is in such position that the bit is a considerable distance off bottom, in which case, even though prevention equipment is successfully applied, the problem of restoring control through pumping of heavy mud in the hole to regain control remains. With mud discharge through the water course holes of the bit located, perhaps, half way up the hole, the problem of mudding off the kicking pressure becomes one of pumping endurance. Frequently two or three days of constant pumping with heavy mud are required to restore control. With a view of overcoming this situation, one operator in the Gulf Coast is considering the installation of two ram-type preventers, with a gate valve between. The theory behind the contemplated installation is that, by passing couplings alternately past the preventer rams (as is being done very successfully in running long strings of tubing into high pressure wells without killing them) drill pipe can be lubricated back to bottom where the heavy mud will make its effects felt in a matter of hours instead of days. Although representing a greater investment in control equipment, occasions arise when ability to reach bottom with heavy mud may quickly offset the cost of additional equipment by savings effected in shutdown time as well as in providing control at a needed moment.

A new control hook-up which appeared in the Gulf Coast Field recently has been worked out by the Cameron Iron Works of Houston. This hook-up includes a double-pressure operated ram type preventer on the casing, with a heavy pressure operated gate valve of new design installed above. The theory of operation is that, in case of a bad blow or kick, rams of the preventer may be closed and the pipe hung on the rams immediately below the kelly joint. The rams exert sufficient friction on the pipe suspended to permit the kelly joint to be broken out, and lifted. The pressure operated gate valve above may then be closed instantly, and the well closed in, ready for circulation of the heavy mud to re-establish control. Several of these installations have been made recently, and an illustration of one of them is shown.

Tight Casing

The significance of tight casing in providing ultimate control of high pressure wells, and in protecting upper sands against surcharging from lower sands, is reflected in the stringently enforced Railroad Commission rules with reference to testing of all casing strings. In the Greta Field, Refugio County, for instance, all casing strings are required to be tested to 2,000 pounds pump pressure, and, if at the end of 30 minutes, pressure shows a drop of 150 pounds or more, the casing is condemned.

In the final analysis, safe drilling in high pressure Gulf Coast areas must rest heavily upon the drilling crew. No matter how elaborate or costly the control equipment provided on a well may be, it can be no more effective than the crew that operates it. General recognition of this fact has led, as is well known, to regular blowout prevention drill in many fields. Here again the Railroad Commission has taken cognizance of the importance of the human element, and has prescribed rules, as in the case of the Greta Field, which tend to keep the men alert and constantly reminded of their responsibility. One rule is that, when coming out of the hole with the drill pipe, a fill up line shall be turned into the casing to insure a

(Continued on Page 143)

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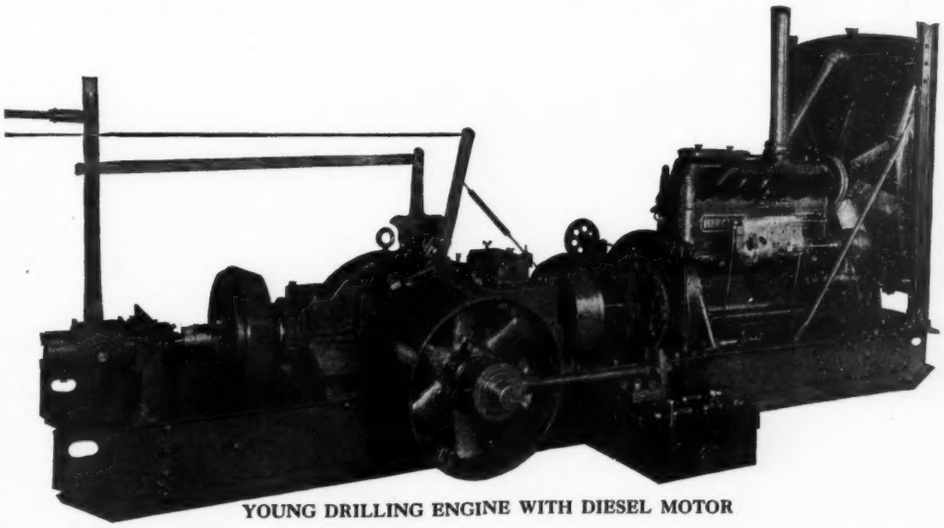

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Double Drawworks Insures Against Shutdowns During Critical Periods

Development of the new deeply seated Bosco Field on the Acadia and St. Landry Parish line in coastal Louisiana has introduced to the Gulf Coast a number of departures in drilling and production practices, among which has been the use of double drawworks on all rigs. Rigs with auxiliary drilling equipment previously had been operated in some California fields, so when Superior Oil Co., a California company, moved to the Gulf Coast and assumed development of the Bosco Field it proceded to make double drawworks and engines standard set up on all operations.

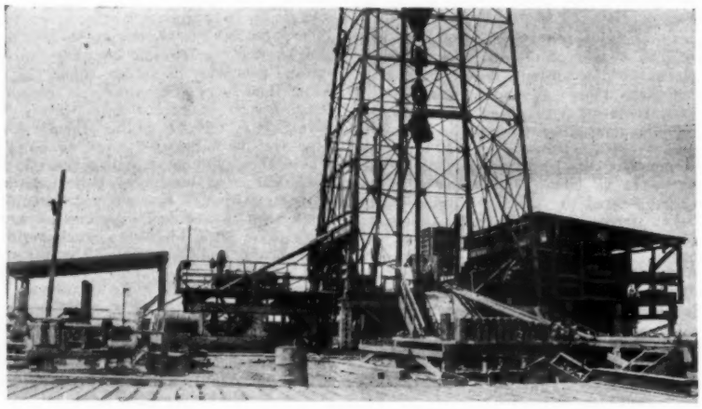
Such installations are being worked not only on the company's own rigs but also on those of contract jobs. The operating company, Superior Oil Producing Co. of Louisiana, a subsidiary of the Superior Oil Co. of California, has only two rigs in the field itself. Smith & McDannald, drilling contractors, however, are running three rigs, and Loffland Brothers four rigs. The former contractors also are running another rig with double drawworks for Superior & Avalon Oil Co. on a wildcat in the Church Point area of Acadia Parish. So far there are no other such set-ups on the Gulf Coast.

There has been some discussion among other operating companies on the Gulf Coast as to whether the advantages or benefits of the auxiliary drilling equipment on a rig are worth the additional investment cost involved. For lighter work there is not much doubt that the extra equipment is not justifiable, but for deeper drilling with added hazards and a greater investment in hole at stake there are many factors to be considered.

Chief Purpose

The chief purpose of having the auxiliary drilling equipment on a rig is to provide as much insurance as possible against any shutdowns. With only one drawworks, a break or a shut down for repairs might result in the sticking of pipe, a fishing job and possible loss of hole. In the case of a deep hole, with possibly $60,000 to $100,000 at stake, the availability of a standby drawworks and drilling engine for use immediately, simply by the driller walking over to the other side of the derrick floor, and throwing in the clutch, is a very vital benefit.

At Bosco, all drilling is deep, the shallowest production so far being around 7,850 feet with various known producing sands down to 8,900 feet. A number of tests have been carried to below 9,000 feet and one below 10,000 feet. Since the discovery well was brought in last June, approximately 35 tests have been drilled, all to depths mentioned above.



Superior Oil Co.'s double drawworks rig at Bosco

There are various other advantages to having double drawworks on rigs in such deep drilling. One of these features alone, that of cutting off the drilling line will save enough time on an 8,500 foot hole to justify the extra investment, not to mention the savings in lengthening the life of drilling lines. It has been found that it is economy to buy long drilling lines, usually 2,500 to 3,500 foot lengths, or as long lines as can be spooled conveniently on the two drums, and then at regular intervals, according to trips made, cut off 50 to 75 feet. By cutting off the line at intervals, the point of wear is moved, and the complete wearing out of the line by continued travel at one point is eliminated. When the moving point of a line is not moved, four or five round trips with the pipe in a deep hole generally makes a line unsafe for further work and in discarding it several hundred feet of good line that has not received much use must be discarded with the worn section.

Advantages Cited

This practice of cutting the ends of the lines, which must be done quite a few times on a deep well, is facilitated by the drum on the auxiliary drawworks, and can be done in an hour or less. Without the extra drum the blocks would have to be laid down and the line pulled over by hand, which would require a considerable length of time and at the same time the job is inconvenient. Also, single drums cannot handle such long lengths of line easily and shorter lines cost more proportionately.

Another saving of time can be made by use of the two drums when a new line has to be put on. This usually has to be done once and oftimes more than once on a deep well. The extra drawworks also can be used to advantage in pulling pipe when making rat hole connections, speeding up drilling time by saving interference with the operation of the regular drawworks. This also is a factor in setting casing by permitting the use of the opposite cathead in pulling in the next joint of pipe to have it ready by the time the preceding joint is lowered.

In the setting up of these rigs, the two drawworks are placed on opposite sides of the derrick floor facing each other. The drilling line is strung as customary and the dead end, which otherwise would be anchored to the derrick sill or elsewhere, is fastened on the drum of the auxiliary drawworks. When the main drawworks is shut down it is only necessary to start up the engines driving the extra drawworks to continue operations without interruption. In such installations, the pipe rack is placed at one side of the derrick instead of in front as customary.

When development of the Bosco Field was started on a large scale after the completion of the discovery well, complete new rigs were provided except for the auxiliary drawworks, which were taken from other rigs. The auxiliary equipment is somewhat smaller than the main drawworks, which installations consist of the largest and heaviest equipment available. The latter are equipped with 9-inch shafts and are driven by 14x14 engines of the roller bearing piston valve type. Mud pumps used on these jobs usually are 14½x7½x18 in size. Steam pressure of 350 pounds is required to operate these engines and pumps and the usual set up includes five 125 horsepower boilers.

Size of Outfits

Indicative of the size of each of the outfits is the large Kelly joint, which on each rig is 7 inches square and 54 feet long. Box and pin joints are upset right in the Kelly which has a 4-inch water course. Derricks being used in the field are 136 feet high. All equipment is of the latest and heaviest type. This has been provided in view of the great depths expected to be drilled and to facilitate the drilling of these holes with a minimum of time and trouble.

Wells in the field now are being drilled to depths of 8,700 and more in record time of approximately 25 days. A record of one well, representative of some of the speed, follows: Started rigging up January 30; started drilling February 1; completed drilling February 25; total depth 8,659 feet; finally completed producer, March 8. Drilling time on this well from February 1 to February 25 was 24 days. Several wells have been put down in shorter time, and a number have required more time.

In drilling of these wells, 17½-inch hole usually is started and carried to around 1,240 to 1,250 feet, where 13⅜-inch surface pipe is cemented. Open hole is drilled from there to the top of the first producing horizon around 7,850 feet where 9⅝-inch casing is cemented. If this horizon is not productive the hole is carried on down and on lower sands 7-inch casing is set and cemented.

Drilling camp in Louisiana swamp

Plenty of water in Louisiana Gulf Coast

Electrical Prospecting Methods Demonstrated

By E. W. K. ANDRAU

Electrical well surveying as it is presently in use, is a French invention imported by the Societe de Prospection Electrique, Procedes Schlumberger, Paris. The method of this company under the name of Schlumberger Electrical Prospecting Methods (lately changed to Schlumberger Well Surveying Corp.) was first introduced in the United States by the Gypsy Oil Co. during the fall of 1929 and was employed for about three months in Oklahoma. At that time only the resistivity of the formations was measured. The first publication in the United States which accompanied the introduction of the method by the Gypsy company was a resume, given in the November, 1929, issue of Mining and Metallurgy of the following paper by C. and M. Schlumberger: "Communication sur le carottage electrique." Deuxieme Congres International de Forages, Paris, September, 1929.

Shortly after the work done in Oklahoma, Schlumberger methods were given a trial in the Gulf Coast at the combined cost of the Humble, Gulf and Shell companies. Some 40 wells were surveyed in different producing fields and wildcat areas. The results of these surveys, which consisted of only a resistivity graph, were considered unfavorable and the use of this method was discontinued.

Geologists in Russia had readily adopted the Schlumberger method and through their initiative and co-operation Messrs. Schlumberger and Leonardon were able to submit a more comprehensive paper which stressed the economic importance of their method. Their paper was submitted during the New York meeting in February, 1933, of the American Institute of Mining and Metallurgical Engineers, and is listed as follows:

Technical Publication No. 503, "A New Contribution to Subsurface Studies by Means of Electrical Measurements in Drill Holes," by C. and M. Schlumberger and E. G. Leonardon. Before the publication of this paper, however, Shell Oil Co. of California, benefiting by Shell's experience in Venezuela, introduced the newly improved method on the West Coast during the latter part of 1932. The success that it apparently obtained in defining oil-containing sand bodies unquestionably must have been the incentive for the Shell Petroleum Corp. giving the method a second trial in the Gulf Coast.

The first survey was made in Shell's No. 3 Fontenot in the Iowa Field, Louisiana, on February 7, 1933. Unlike California, where its use spread rapidly, the company in operating in the Gulf Coast had to overcome a certain prejudice against its use, as a result of its previous failure in satisfying the geologists. Shell Petroleum Corp. very soon surveyed every drilling well. It was closely followed in this procedure by the Texas Co., which company, at that time, had perplexing subsurface problems to cope with in its exploitation of the Manvel Field; and also by the Barnsdall Oil Co. in the active development of its Iowa properties in Louisiana. Shell and Barnsdall's Iowa properties and the Texas Co.'s Manvel Field are at present the best examples of what can be achieved with electric surveying.

The existing detailed subsurface control in these two fields has been made possible mainly through electrical well surveying. Lately fields like Bosco (Superior Oil Co.) and Leesville (Gulf and Texas companies) have been exploited with the aid of electric log correlations.

In California besides its use in the exploitation of a field, the Schlumberger company responded to an increased demand for detailed surveys of the producing horizon in salt water producing wells. Its success in being able to advise the operator on the source of salt water had much to do with the company's expansion in California.

In the Gulf Coast some demand of this kind was created in fields such as Barbers Hill, but on the whole the general recognition of electric well surveying has been a result of the success obtained in wildcat wells. The saft formations, the relatively thin oil sands, the powerful pumps and the drilling speed with which independent operators wish to reach their objectives, eliminating coring as much as possible, are probably the causes of oil sands being "passed up." The electrical surveying device duly registered these oil sands and, although it is not always possible to definitely distinguish a sand containing oil from a sand containing water, it may be said that their success in giving the oil man more pertinent and detailed information on the prospects of his test, caused a great demand of their service. The "wildcat" well in the Texas-Louisiana Gulf Coast (Southwest Texas excluded) that is not surveyed by the electrical method is, at present, an exception of the rule.

It is the purpose of this paper, however, not to discuss the sometimes contested abilities of the electrical method to determine the segregate gas, oil and salt water-containing strata, but to lead toward a more general understanding of the value that this method has for the geologist in correlating his well logs, and in constantly adjusting his knowledge in regard to stratigraphy and tectonics.

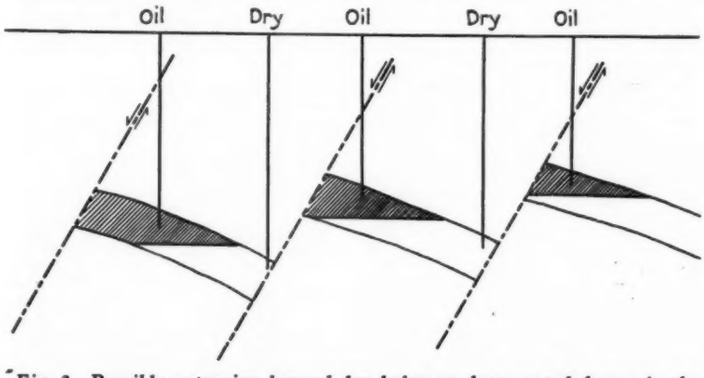


Fig. 2—Possible extension beyond dry holes on deep seated domes in the Gulf Coast

A lack of co-ordination in the nomenclature, representation of the electric log and working methods exists at present. So as to standardize in this respect, the accompanying type log has been given.

Originally the resistivity graph was placed on the right hand side of the log. When the porosity graph was added it was drawn in dotted lines on the right-hand side of the log overlapping the resistivity graph. This method was in use in Venezuela and to some extent in Russia and other countries. In California the resistivity was shifted to the left-hand side of the log, whereas Gulf Coast geologists kept the resistivity graph where it was originally used and placed the porosity graph on the left-hand side. This latter method would appear more logical and more practical and is herewith proposed as a standard.

The usual scale for correlations, in which surveys are made, is 1 inch to 100 feet. The Shell Petroleum Corp., the Texas Co., Superior Oil Co., Barnsdall Oil Co., Magnolia Petroleum Co. and others have standardized on it. This scale has the advantage of being readily adaptable to the driller's and core log without photostatic reductions which would involve an undesirable graphical change in the millivolts (porosity) and ohms (resistivity) scales. For other purposes than correlations more detailed scales, in spite of the additional work which they entail, are sometimes advisable. A scale of 1" :20' is in use whenever details are desired on oil, gas and water accumulations.

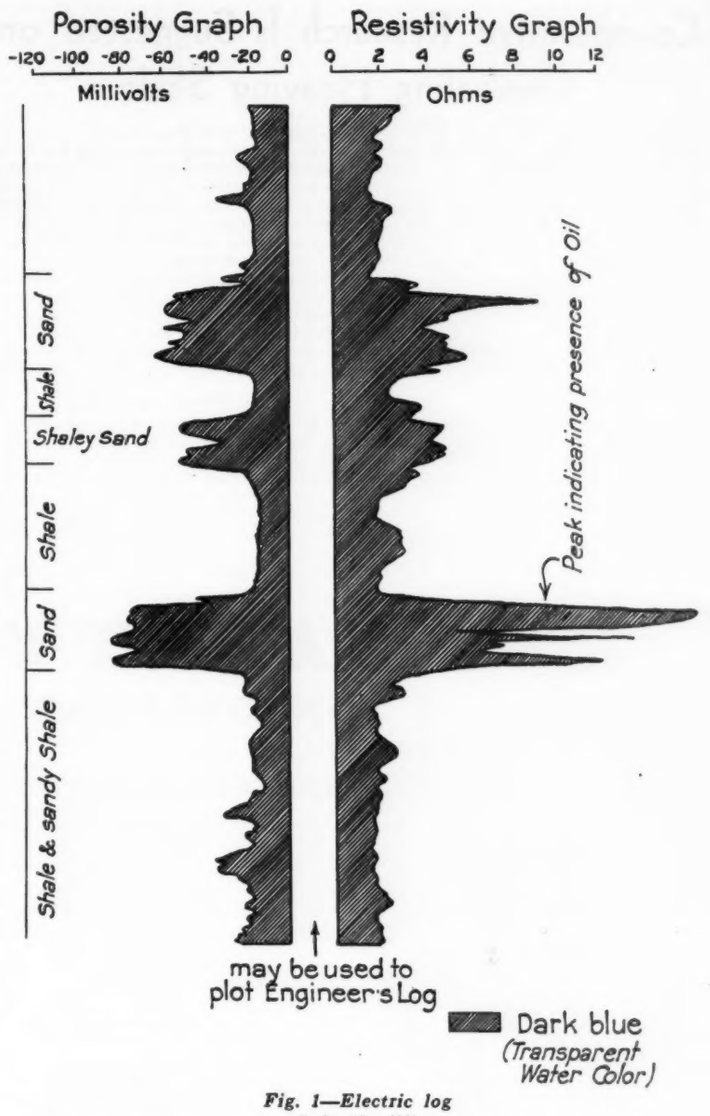


Fig. 1—Electric log
Scale: 1" = 100'

Note: The dark blue coloring is found to be of considerable help in recognizing marker beds.

Correlative Value of Electrical Logs

In a paper presented by the writer on March 22, 1935, at the annual A.A.P.G. meeting in Wichita, Kans., the following statements were made based on cross sections on three deep-seated domes in the Gulf Coast, namely: Livingston, Manvel and Iowa. It was pointed out that correlations between electric logs in fields as Iowa, Louisiana, and Manvel, Texas, indicate that major subsurface irregularities from well to well, which might previously have been explained by lensing and gradations are due to faulting.

In correlating electric logs faults may be traced from well to well. The fact that faults in the Gulf Coast usually seem to act as barriers gives the detailed correlation of well logs and the outline of the various fault blocks a particular importance. Each block namely, will have its own gas and water level and should be regarded as an individual pool. In the Iowa Field, for instance, it is found that a Miocene sand in an up-thrown block is salt water bearing, whereas a few feet away across the fault this same sand will be found some 300 feet lower containing oil and gas. Considering the usual tilt-

(Continued on Page 139)

Co-operative Research Is Suggested on Combating Heaving Shale

Although important strides have been made in overcoming it, "heaving shale" remains the biggest problem and hazard on the Gulf Coast and still stands as a barrier to exploration of lower horizons in which it exists. Persistent efforts have rewarded coastal operators in gradually increasing the amount of footage which they can make through the shale, and in a number of instances substantially thick sections of shale have been penetrated successfully, but each time a shale job is completed the operator breathes a sigh of relief and nervously wonders whether the feat can be accomplished twice in succession.

More concerted efforts to combat the shale problem have been made within the past year than ever before. It is recognized that the high gravity coastal oil of the future is going to have to come from great depths and below these troublesome formations, and to reach these potential reserves in areas where heaving shale exists it will be necessary to eliminate the shale as a drilling hazard.

To date no particular method has been definitely proved entirely satisfactory in overcoming this obstacle to economical deep production. Furthermore, hardly two companies, or even individuals, can agree on just what heaving shale really is, its characteristics, the nature of its action, the causes, or much of anything else about it. Each operator has been working more or less along his own line and it seems that hardly two times in succession does the method used in drilling shale in one instance work in another.

Research Suggested

While there has been some co-operation among some companies in the work with the shale problem, attempts to drill through heaving shale have been largely a matter of individual effort. It has been suggested that it now is logical for all the major companies to get together, set up a research laboratory, and with each company represented by its geologist, chief engineer, petroleum engineer and mud engineer, correlate all the available data and drill jointly a few shale wells. This is the plan which has been advanced by C. B. Kennedye, Houston engineer, who has devoted considerable research along these lines and who has done much in the way of development of practical methods and means of drilling through troublesome formations.

So-called "heaving shale" on the Gulf Coast occurs in several horizons, the most aggravating shales being in the Jackson and Fayette. Composition of the shale varies in different areas and wells, and even different types of the shale often are encountered in the same well. The thickness of sections varies from a few feet to as much as 2,000 feet and more, the latter being the greatest thickness so far penetrated in one section. The most troublesome shale usually is found at depths below 5,000 feet.

While there are a number of different types of the shale, all of which are described differently by various geologists and paleontologists, the really troublesome type is the greenish buff colored type which is saturated with dissolved salt and frequently streaked with clay sand, sandstones and in some cases with bentonitic clay. In some areas of the Gulf Coast fossils and silicified wood also are encountered. Frequently these formations carry some oil and gas. Much of the trouble is experienced in these formations when they are found on marked dips. What few cores some operators have been able to get in these shales has indicated the dips to be almost vertical in the majority of cases.

Analysis of Shale

As to the types or characteristics of shale, a thorough analysis of these was given by M. T. Halbouty, geologist and petroleum engineer, Yount Lee Oil Co., Beaumont, Tex., in an article in the July 12, 1934, issue of The Oil and Gas Journal. Mr. Halbouty is recognized as one of the leading authorities on the subject, and his company no doubt has done more in combatting troublesome formations than any other company on the coast.

Mr. Halbouty divides heaving shale into three general types: First, there is the hard, compact shale which is hard to drill; second, there is a hard, brittle shale which can be drilled easily; and, third, there is a sticky shale in which it is difficult to make hole. All these types, combinations of them, or gradations of them, may be found in a single well.

In his discussion of these shales, he explained that the first type, or compact type of shale, would be expected to have enough resistance to hold itself together, and would if the drilling mud were in its proper condition. A microscope reveals that this formation consists of alternate layers of bentonite and shale. On contact with any free water, the bentonite absorbs the water, and in swelling creates a wedging effect, causing what is known in chemistry as an osmatic pressure which tends to grow with the swelling until a point is reached where the pressure becomes so great that the shale has to give way. The giving in is in the direction of least resistance which is the drilled hole. This, the driller calls "heaving." Such action, when started, is difficult to stop.

Brittle Type

The second type of shale, the one that is hard and brittle, breaks down very rapidly when it comes in contact with free water, simply because of its brittle texture. The shale is not of the compact nature and water penetrates the interstices of the large pieces of shale and loosens the binding effect they naturally have. This causes the brittle pieces to become dislodged from their position and follow the general movement of the mud upwards, and a leaching out of a cavity in the shale takes place. As there is no wall built around this shale, the mud circulates very freely and "washes out" more of the shale, resulting in larger cavities, which in turn leaves the more resistant "non-heaving" shale, which lies above, to be unsupported, and this naturally will slough to the bottom of the hole, sticking the pipe or causing other serious damage. The leaching usually is so rapid that the pumps cannot handle the load, and as it is difficult to hold the shale in suspension, the shale settles, drops over the drill collars, bit collar and bit, resulting in what drillers designate as "balling" of the bit. Circulation becomes shut off and usually drill pipe sticks.

The third type of shale which is of the extreme sticky variety also contains bentonite. The stickiness of the shale alone makes it difficult to drill because of the "balling" of the bit and the spudding which generally is done. The presence of bentonite adds to the difficulty a swelling condition as in the first general type of shale.

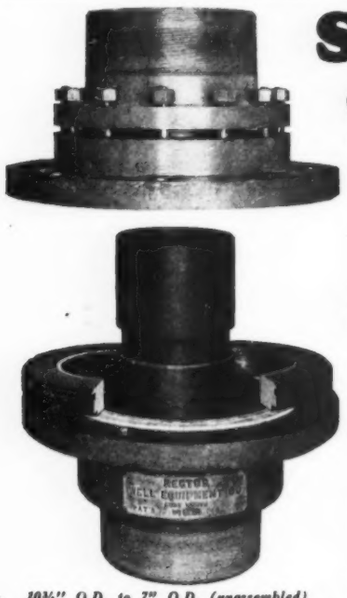
Mr. Halbouty points out that one of the major factors in the heaving shale problem is the dip of the shale and that when the angle of repose is beyond the critical point the shale has a tendency to slough, regardless of the type. Such a condition is common on the flanks of domes.

Drilling Fluids

It is believed generally at this time that the quality and control of drilling fluid will be the major factor in overcoming the shale problem. However, there is no doubt that mechanical means will also play an important part, and now a number of operators are definitely attempting to combat the problem by a combination of mechanical and chemical methods.

The subject of control and conditioning of drilling fluid as the practice relates to the drilling of troublesome formations is discussed by C. B. Kennedye in another article in this issue of The Oil and Gas Journal.

The present tendency in drilling fluids through heaving shale is toward the use of lighter weight, higher viscosity muds with a minimum of free water and as little acid as possible. High viscosity mud is suggested because it is a known fact that such a mud seals off surface sands



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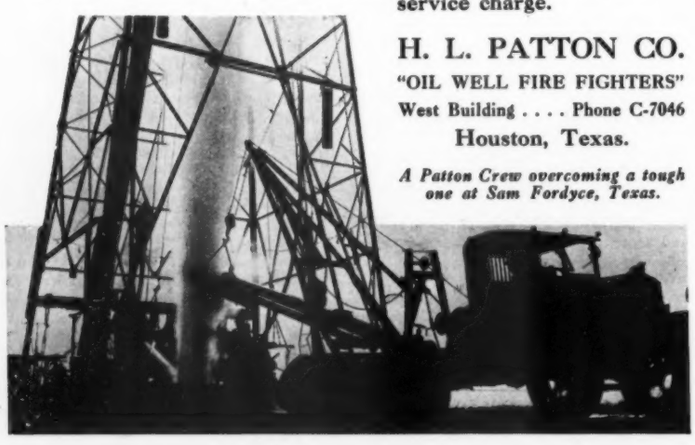

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and unconsolidated formations and there is no reason to believe that it will not seal unconsolidated formations at lower depths. The difficulty in the past in handling such muds has been the lack of pump pressure but this is being overcome with the development of pumps of higher pressure.

In the light of laboratory experiments it is conceded that the glue-like film which is formed on the wall of the drilled hole will not withstand pressures such as the natural fluid head at the depths these formations are encountered, and the porosity of the formations, an infiltration of water and even mud itself can be expected in the use of low viscosity fluids. The infiltration of water and mud, or acid, if acid is used with the mud, causes the shale to become slick but not plastic, the bentonite in the shale to swell, and the formation to cave.

Jetting or Channeling

Another thing that possibly takes place in the shale is the jetting or channeling effect due to the difference in viscosity of the incoming mud and that of the fluid in the well. Due to the temperature and lower velocity, the fluid in the hole is much more viscous than the incoming mud. This with the density of the shale cuttings has a natural tendency to cause the jetting resulting in precipitation of the dense heaving shales. On one well the cuttings coming out of the hole were weighed, revealing that although the well was drilling at the rate of several feet per hour only the equivalent of 1 foot of cuttings was coming out of the hole.

As stated previously one of the contributing factors to disaster in heaving shale is the accumulation of cuttings in the hole. Because of the depth and pressure of the fluid column only at the bit outlet and for a small space above the bit is there any high fluid velocity. Any sudden retarding of velocity tends to precipitate cuttings, as can be seen by observing a mud ditch. It is possible that some spiral propelling device on the drill pipe, one located on the bottom and others at intervals to the top would by their revolving action and centrifugal force prevent this accumulation and create sufficient agitation to keep the entire fluid column uniformly less viscous and prevent any precipitation. This also possibly would result in lowered pump pressures required to circulate the fluid.

One reason for failure in combatting shale in the past has been the lack of preparation in advance of hitting the shale. The importance of having the mud in proper condition before the shale is encountered now is becoming more generally recognized. Once trouble is experienced in shale it is difficult to remedy it, and a hole will continue to cave. Several wells have pumped out hundreds of cubic yards of shale and never moved downward a foot. Companies which have had the greatest success in drilling shale start building up their mud for the shale at least 1,000 feet above the shale. A geologist can determine from geological data and correlation approximately where the shale can be expected. Treating of mud, however, should start at the top of the hole and is being done by various companies. In several wells lately, operators have set a string of pipe on top or a short distance in the shale. In this they eliminate any possibility of trouble from above and thus their efforts to combat the shale are facilitated.

Diameter of Hole

It is considered important by some operators that the diameter of the hole being drilled through the shale be as close as practical to that of the last string of casing. Any difference in the size of the hole results in a slowing down of velocity of the returns. If there is an excessive difference in size of the two holes there is a sudden slowing down of velocity which causes a floating effect of the cuttings and consequent accumulation of these cuttings. and the drill pipe hitting the surface casing plasters them to such a point that it sometimes is difficult for an operator to get out of the hole with the pipe. In one well, drill pipe stuck 42 different times in the surface casing due to this trouble. In this well 15-inch surface casing was set at 1,600 feet while only 9⅞-inch hole was drilled below this.

A possibility of trouble in drilling heaving shale which few operators have taken into consideration is the scarification of the wall of the hole by action of the drill pipe. It has been demonstrated on numerous occasions that regardless of how small the weight of the bit there is a natural elbow in the drill pipe where it goes from tension to compression. It is probable that no matter how effective a mud might be the elbow continually hitting the wall would scrape it and prevent the mud from walling up the hole. It is proposed that means be taken to eliminate this crook or elbow as one phase of solving the heaving shale problem. The same type of device previously mentioned for use in maintaining circulation and agitation of the mud perhaps would be effective when fastened on the pipe at the elbow. Such devices have been used on drill pipe to facilitate straight hole drilling.

Most of the work with heaving shale in the past has been directed toward providing proper and effective drilling fluids, and muds of various chemical and physical content have been tried. Oil emulsions have been tried in drilling of several tests. These fluids have one particular point in their favor in that free water is entirely eliminated. The use of synthetic muds composed of caustic soda, quebracho and a bentonitic clay was given credit for the successful drilling of 2,000 feet of shale recently in a well at Louise, Tex. However, notable records have been made in drilling of shale and other troublesome formations with muds composed only of native clays, or other finely ground clays.

Methods of Drilling

Methods of drilling through shale which involve the use of collapsible blade wire line bits, or other bits which can be milled out easily in the event the drill pipe becomes stuck have a very practical application in drilling of heaving shale. By such methods, special flush joint pipe or special casing is used as drill pipe but can be left in the hole as casing. Such methods also eliminate the necessity of frequent pulling of pipe, as in conventional drilling, to change bits. Pulling of pipe is one of the greatest hazards in shale as in this operation a swabbing effect takes place which sometimes proves disastrous. In the case of the collapsible blade bit, the bit can be pulled out through the pipe by wire line, while the millable bits can be milled out easily to permit deeper drilling. The use of the wire line, drilling-coring bit also has facilitated drilling of heaving shale. In many of these cases, the proper control and conditioning of drilling fluid is essential.

Some operators have attempted to drill through shale under pressure. Others have attempted to reverse circulation, pumping good clean fluid around the drill pipe and the cuttings through the bit and drill pipe on the theory that the higher velocity through the drill pipe would insure getting all the cuttings from the hole. All have had partial success and there are favorable possibilities for further development on these lines, and with the contributions of each and the persistent and co-operative efforts of all companies, there is no doubt the shale problem will be entirely solved eventually.

Electrical Prospecting Methods Demonstrated

(Continued from Page 137)

ing of fault blocks, it is therefore likely that extensions beyond a dry hole and across a fault will be found in deep-seated domes. (See Figure 2.) Such extensions, at present, can only be intelligently predicted by means of electrical well logs and their correlations.

Correlation of electric logs in one field should enable the subsurface geologist to reduce the coring cost of a well considerably.

After having surveyed a certain number of wells by the electric method it will be possible to construct a type electrical log. In fields studied so far it was found that each sand group had a typical porosity graph, which could be recognized in "wildcat" wells in the neighborhood. In drilling a wildcat well near an area in which the electrical type log is known, considerable money could therefore be saved by drilling with a minimum amount of coring and if desired with a smaller hole.

In having an electrical survey made in the upper Miocene or at a safe distance above the objective pay sand, a correlation could be obtained, with which a new interval for straight drilling could be determined allowing for a 500-foot margin on account of possible faulting. A second and third survey could be made if desired as drilling approaches the objective. In this way the pay horizon (usually the Marginulina sand in the Gulf Coast) may be approached cautiously leaving the last 500 feet to be cored in an exploratory manner.

Considerable saving could be made in this way as the cost of 10 wire-line cores is approximately equivalent to the cost of surveying a 5,500-foot hole with the first water string at 1,000 feet.

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By L. T. ANDERSON
Reed Roller Bit Co.

Several years of experimenting by an old driller and an oil field machinist proved the idea that a core could be cut through the regular fishtail type drilling bit and recovered without removing the drill pipe from the hole, and that drilling could be continued in the usual manner until such time as the drilling-coring bit was dulled or another core desired. As is the usual case, many difficulties, technical and financial, were encountered until in 1929 a prominent manufacturer of drilling tools acquired an exclusive

Bottom view of drilling bit with cutter head showing through head in coring position

license under the inventors' patents, subsequently purchasing them outright. Many changes in design and in specification of material were made and manufacturing started on a number of coring outfits. From that time on there has been a continuous development of this equipment leading to its present place of importance in the drilling scheme.

Construction

The drilling-coring bit is of regular fishtail type with center hole to accommodate the core barrel and center bit and can be used for drilling and coring any formation regularly drilled with a drag type bit. A special slush ring is welded inside the bit connection providing a seat for the core barrel and center bit and permitting circulation while the core barrel or center bit is in drilling position. The drilling-coring bit operates on a forged drill collar attached to the drill stem by a special drill collar sub that carries a driver in the lower end for locking and driving the core barrel when in operating condition. The core barrel is composed of a hard surfaced cutter head with a core catcher in its lower end; a two section barrel, at top of which is the regular valve for permitting displacement of mud fluid as the core enters the barrel; a spring section, above the valve, permitting retraction of the core barrel when locked in coring position so that it will at no time take the weight of the pipe instead of the drilling bit; above this the locking and driving dog, which when in operating position in the driver referred to above in the special drill collar sub, causes the core barrel to be held in position with the cutter head against the formation and also causes the barrel and cutter head to rotate with the drilling bit; and immediately above and a part of this driving dog, is a spear head, which when pulled upwardly causes the driving dog to release from the driver. Such upward pull is effected with an overshot. The overshot carries two spring actuated grabbing dogs. When the overshot contacts the spear head, the springs permit the dogs to expand and grab the spear head. The overshot is attached to a solid steel overshot weight at top of which is a regular wire line socket. The overshot can be released from the spear head, when desired, while the core barrel is

Overshot suspended over rotary table, ready to go in after core barrel

locked in coring position by simply dropping a trip tube down over the wire line and over the overshot body. The trip tube is a length of tubing of such outside diameter that will pass through the tool joints and over the overshot and is supported at the surface on a wood guide plug. The center bit is a small diamond pointed, hard surfaced bit which operates within the center bore of the drilling bit, except during coring operations, and is attached to a solid steel sub provided with a shoulder to seat on a slush ring in the drilling bit to prevent the center bit assembly from passing through the drilling bit. This sub attaches to the locking and driving section in a manner identically with that of the core barrel.

Operation

Drilling proceeds with the drilling-coring bit, drill collar and drill collar sub attached to the drill stem in the usual manner of fishtail or drag bit operation. When a core is desired, the kelly is removed and the core barrel assembly is dropped down through the drill stem to the drilling bit where it is automatically locked in coring position. The kelly is immediately replaced, pump started and drilling proceeds in the usual manner with the core barrel in operating position. When required amount of hole is drilled to provide the length core desired, the kelly is again broken and the overshot is run down in the drill stem on a five-eighths or three-qaurters inch wire line operated from an auxiliary reel. The reel is driven directly from the line or jackshaft of the drawworks, or an auxiliary steam engine, electric motor or gasoline engine. The overshot is run as rapidly as it will drop to the core barrel where it engages and attaches itself to the spearhead of the core barrel. An upward pull on the wire line releases the core barrel and it is quickly pulled to the surface up through the drill pipe as the line is reeled up on the auxiliary reel. With the recovery of the core barrel, the kelly is again replaced and drilling proceeds in the usual way. The center bit assembly is used in sticky formations to increase drilling speed by diversion of the slush action to the cutting edges of the drilling bit. It is dropped into operating position and recovered with the overshot in the same manner as the core barrel.

Driller holding 3½-foot length of core

Driller holding core barrel ready to drop into drill pipe. This barrel is capable of taking a 10-foot core

Many hours of drilling time are saved by eliminating round trips of the drill pipe when a core is desired, and hundreds of dollars in drilling line costs and in maintenance of rotary equipment are eliminated in each deep well drilled. This equipment is especially adapted to coring in heaving or gas-bearing formations where blowouts threaten when drill pipe is removed.

This core barrel has a high actual recovery because the core cutter extends below the drilling bit and is continually active in the formation with minimum chance of the core being washed away as it is being cut. Its widespread use in the Gulf Coast is evidenced by the following record: Used on 1,285 wells; successfully recovering 54,403 cores; drilling approximately 2,000,000 feet of hole; average time per core 57 minutes; average core recovery 71 per cent, and deepest core 9,603 feet to 9,606 feet.

Retail Gasoline Prices Dropped Cent During Year

Sales taxes on gasoline in the United States averaged 40 per cent of the retail price of the product on March 1, 1935, compared with an average of 37 per cent March 1, 1934, the American Petroleum Industries Committee, reports, based upon reports from 50 representative cities.

During the year the retail price of gasoline, exclusive of tax, dropped 6.5 per cent, and the tax per gallon rose slightly more than one-half of 1 per cent. On March 1 this year the average retail price in 50 representative cities was 13.3 cents a gallon, approximately 1 cent less than on the same date a year ago, when the price was 14.05 cents.

The average tax March 1, 1935, including state and federal levies, amounted to 5.24 cents, an increase of .58 of 1 per cent over the 5.21-cent average of March 1, 1934.

The cost of gasoline to the public, which includes the price plus the tax, dropped during the year from 19.26 cents a gallon to 18.37 cents, a decrease of 4.6 per cent.

Houston Equipment and Engineering Exposition Is Ready for Opening

HOUSTON, Tex., Apr. 1.—With an aim toward presenting oil tools and machinery in a manner that will prove of greatest benefit to the host of visitors that will inspect them at the Sixth Annual Oil Equipment and Engineering Exposition, which will be held at the Convention Hall in Houston, from April 8 to 13, inclusive, manufacturers and supply companies are paying special attention to the arrangement of their booths. Wherever possible, equipment will be in motion and this feature, together with a display of construction details, will enable the users of products to make a thorough study of their operations. All branches of the industry will be covered with displays of equipment for use in drilling, production, refining, natural gasoline manufacturers and transportation.

Prizes for the best exhibits will be given by the exposition management but the awards will be made by representatives of the various oil companies. The judges selected are Chase E. Sutton, branch manager, Pure Oil Co.; Stanley Gill, consulting engineer; E. C. Lawry, petroleum engineer, Shell Petroleum Corp.; Paul Hubbard, chief engineer, Gulf Refining Co.; and W. T. Doherty, petroleum engineers, Humble Oil & Refining Co. The awards will be made not only on appearance but on the methods of presentation of equipment; and whether or not it is being operated or demonstrated will naturally be taken into account. The size of the exhibit will have no bearing on the judging.

Interesting Attractions

One of the many interesting attractions will be a drilling rig in operation, scheduled to drill a hole to around 2,000 feet during the show. The rig to be used is a portable combination of rotary and hydraulic rig mounted on a 3-ton truck, which has a 210-inch wheel base. Methods of applying equipment and of meeting field emergencies will be demonstrated including the extinguishing of oil and gas fires and the prevention of such fires. Various other demonstrations will present safety measures for use on the various phases of the oil industry.

First aid teams, representing oil companies in all parts of the State, will compete in a first aid contest that will be held daily, while the show is in progress. Championship cups will be given to the first, second and third best teams.

Many foreign countries are expected to have men at the show, including Italy, Japan, Sumatra, Java, Venezuela, Iraq, Trinidad, Poland, Germany, France, Canada, Ecuador, Rumania, Russia, Argentina and Australia.

All available exhibit space has been taken, with more than 247 manufacturing or distributing companies represented. Concerns which have signed definite contracts with their names, addresses and space numbers follow:

A

A-1 Bit Co., Houston, Tex., 117B-119.
Abegg & Reinhold Co., Los Angeles Calif., 522-524-623-625.
J. S. Abercrombie Co., Houston, Tex., 304-306-405-407.
Abercrombie Pump Co., Houston, Tex., 304-306-405-407.
Air Maze Corp., Cleveland, Ohio, 736-738.
Allen, Sproull & Allen, Houston, Tex., 329-B.
Allis Chalmers Mfg. Co., (Tractor Division and Industrial Division), Milwaukee, Wis., 1,002.
Alphonso Mechanical Boiler Cleaner Co., Houston, Tex., 235.
American Hammered Piston Ring Co., Baltimore, Md., 501.
American Iron & Machine Works Co., Oklahoma City, Okla., 104-106.
American Lubricator Co., Dallas, Tex., 433.
American Optical Co., Southbridge, Mass., 712.
American Sand Banum Co., Inc., New York, N. Y., 402.
American Zinc Institute, Inc., New York, N. Y., 428.
Alexander Anderson, Inc., Fullerton, Calif., 126-128.
Appleton Electric Co., Chicago, Ill., 715B-717A.
Association of Drilling Contractors, Houston, Tex., 730.
Atlas Engineering Works, Houston, Tex., 210.
Austin Trailer Equipment Co., Muskegon, Mich., 243-245-247-249.
Authorized Appleman Bit Service Co., Inc., Houston, Tex., 427.
Ayres Engineering Co., Houston, Tex., 514-516.

B

Baash-Ross Tool Co., Los Angeles, Calif., Norvell-Wilder Section.
Badgett Steam Lubricator Co., Chickasha, Okla., 528-530.
Baker Oil Tools, Inc., Huntington Park, Calif., 622-624A-723-725A.
Baldwin-Duckworth Chain Corp., Springfield, Mass., 534-536.
Bannon Sales Co., Houston, Tex., 206.
Baroid Sales Co., Los Angeles, Calif., 323-325-327.
Beaver Pipe Tools, Inc., Warren, Ohio, 713-715A.
Bendix Products Corp., South Bend, Ind., 243-245-247-249.
Benjamin Electric Mfg. Co., Des Plaines, Ill., 439.
Bethlehem Steel Co., Bethlehem, Pa., (Mid-Continent Supply Section).
Bettis Sales Co., Houston, Tex., 326-328.
Big Three Welding & Equipment Co., Houston, Tex., (Norvell-Wilder Section).
Bolser Flare Corp., Des Moines, Iowa, 243-245-247-249.
Black, Sivalls & Bryson, Inc., Oklahoma City, Okla., 635-637.
Braden Winch Co., Tulsa, 243-245-247-249.
Brae-Burn Club, Houston, Tex., 714.
Brance-Krachy Co., Houston, Tex., 434-436.
Brauer Machine & Supply Co., Houston, Tex., 112-114.
Bridgeport Brass Co., St. Louis, Mo., 333-335.
Buck & Stoddard, Inc., Los Angeles, Calif., 522-524-623-625.
Buda Co., Harvey, Ill., 736-738.
E. D. Bullard Co., Houston, Tex., 704-706.
Bullum, Inc., Austin, Tex., 308.
Burroughs Adding Machine Co., Houston, Tex., 634-636A.
Burt Corp., Tulsa, 435-437.
By-Products Steel Corp., Coatesville, Pa., 243-245-247-249.

C

Cameron Iron Works, Houston, Tex., 304-306-405-407.
Cavins Bailer Service, Houston, Tex., 602.
Chain Belt Co., Milwaukee, Wis., 214-216.
Chiksan Oil Tool Co., Fullerton, Calif., 522-524-623-625.
Chippewa Shoe Manufacturing Co., Chippewa Falls, Wis., 308.
Lester B. Clark, patent attorney, Houston, Tex.
Coen Co., Inc., Los Angeles, Calif., 514-516.
Coffing Hoist Co., Danville, Ill., (Norvell-Wilder Section).
Columbia Axle Co., Cleveland, Ohio, 243-245-247-249.
Fred E. Cooper, Tulsa, 1,001.
Crutcher-Rolfs-Cummings, Inc., Houston, Tex., 518-520-619-621.
Cummins Engine Co., Columbus, Ind., (Mid-Continent Supply Section).
W. H. Curtin & Co., Houston, Tex., 630-632.

The following companies will be represented in the W. H. Curtin & Co. Section:

J. T. Baker Chemical Co., Phillipsburg, N. J.
Coors Porcelain Co., Golden, Colo.
Corning Glass Works, Corning, N. Y.
Crosby Steam Gauge & Valve Co., New York, N. Y.
Hays Corp., Michigan City, Ind.
International Equipment Co., Boston, Mass.
Kimble Glass Co., Vineland, N. J.
Meriam Co., Cleveland, Ohio.
Precision Scientific Co., Chicago, Ill.
Spencer Lens Co., Buffalo, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, Ohio.
Tagliabue Manufacturing Co., Brooklyn, N. Y.

D

D. & M. Machine Works, Torrance, Calif., 317-319.
M. N. Dannenbaum Co., Houston, Tex., 504-605-607-609.

The following companies will be represented in the Dannenbaum Co. Section:

Barco Manufacturing Co., Chicago, Ill.
Daniel Orifice Fitting Co., Los Angeles, Calif.
Fisher Governor Co., Marshalltown, Iowa.
Peerless Pump Co., Los Angeles, Calif.
Sivyer Steel Casting Co., Milwaukee, Wis.

Darling Valve & Manufacturing Co., Williamsport, Pa., 219-221.
Dean Brothers Co., Indianapolis, Ind., (Norvell-Wilder Section).
Diamond Metal Co., Houston, Tex., 409-411.
Doheny Stone Drill Corp., Houston, Tex., 102-103-105.
Double Seal Ring Co., Fort Worth, Tex., 618.
Drill Pipe & Casing Cutter Co., Los Angeles, Calif., 620-721.
Duff-Norton Manufacturing Co., Pittsburgh, Pa., 238.
Durametallic Corp., Kalamazoo, Mich., 514-516.
Duriron Co., Dayton, Ohio, 514-516.

E

Eason & Theroif Co., Los Neitos, Calif., 231-233.
Eastman Oil Well Survey Co., Houston, Tex., 419-421.
Electric Stop Nut Corp., Elizabeth, N. J., 112-114.
Elliott Co., Jeannette, Pa., 132-134.
Everlasting Valve Co., Jersey City, N. J., 438.

F

George E. Failing Supply Co., Enid, Okla., 143.
Fairbanks Co., New York, N. Y., 231-233.
George J. Fix Co., Dallas, Tex., 534-536.
Ford Motor Co., Houston, Tex., Ford Section.
France Packing Co., Philadelphia, Pa., 206.

G

Galion Allsteel Body Co., Galion, Ohio, 243-245-247-249.
Gardner-Denver Co., Quincy, Ill., 205-207-209-211.
Garlock Packing Co., Palmyra, N. Y., 423-425.
Gas Power, Inc., Houston, Tex., 614.
Robert Gaylord, Inc., St. Louis, Mo., 115-117A.
General Electric Co., Arc Welder Div., 226-228.
Gilmer Co., Philadelphia, Pa., 736-738.
Girten Supply Co., Houston, Tex., 208.
Grant Oil Tool Co., Los Angeles, Calif., 220-321.
Gray Tool Co., Houston, Tex., 314-316-413-415-417.
Gulf Engineers, Inc., Houston, Tex., 522-524-623-625.
Gulf Envelope Co., Houston, Tex., 502.
Gulf Publishing Co., Houston, Tex., 426-527-529.

H

Halliburton Oil Well Cementing Co., Duncan, Okla., 107-109-111-113.
Hamer Oil Tool Co., Ltd., Long Beach, Calif., 528-530-532.
Harrisburg Engineering Co., Houston, Tex., (Mid-Continent Supply Section).
Haynes Stellite Co., Kokomo, Ind., 123-125-127-129-131.
Hercules Motor Corp., Canton, Ohio, (Norvell-Wilder Section).
Hercules Tool Co., Tulsa, 121.
Hewitt Rubber Corp., Buffalo, N. Y., (Norvell-Wilder Section).
Highland Body Co., Cincinnati, Ohio, 243-245-247-249.
Hill & Foster Co., Wichita Falls, Tex., 611.
O. H. Holman Co., Dallas, Tex., 727.
Charles N. Hough Manufacturing Co., Franklin, Pa., 313-315.
Houston Oilfield Material Co., Inc., Houston, Tex., 136-138-237-239.
Hydril Co., Los Angeles, Calif., 102-103-105.

I

Independent Petroleum Association of America, Tulsa, 232-234.
Industrial Sales & Engineering Co., Houston, Tex., 624B-626.
Industrial Scientific Supply Co., Fort Worth, Tex., 535.
International Derrick & Equipment Co., Columbus, Ohio, 1,003.
International Nickel Co., Inc., New York, N. Y., 124.

J

Jefferson Union Co., Lexington, Mass., (Norvell-Wilder Section).
Jenkins Brothers, Inc., New York, N. Y., 633.
Johnston Formation Testing Corp., Longview, Tex., 302-401.
Johnston Well Testing Service, Houston, Tex., 302-401.
Jones Foundry & Machine Co., Chicago, Ill., 727.
Jones & Laughlin Steel Co., Pittsburgh, Pa., (Norvell-Wilder Section).
Joyce-Cridland Co., Dayton, Ohio, 537B-539.

K

Kennedy Valve Manufacturing Co., Elmyra, N. Y., (Norvell-Wilder Section).
Kennedye Well Engineers, Houston Tex., (Mid-Continent Supply Section).
Kerotest Manufacturing Co., Pittsburgh, Pa., 314-316-415-417.
Kibele Manufacturing Co., Dallas, Tex., 528-530.
Kinley Co., M. M., Houston Tex., 601.
Kinzbach Tool Co., Houston, Tex., 615-617.

(Continued on Next Page)

Koenig Iron Works, Houston, Tex., (Outside Space).

L

Lacey, B. B., Houston, Tex., 434-436.
Lagonda Manufacturing Co., Jeannette, Pa., 132-134.
Lamb Piston Sales Co., Torrance, Calif., 522-524-623-625.
Layne & Bowler Co., Houston, Tex., 429-431.
Leschen & Sons Rope Co., St. Louis, Mo., (Norvell-Wilder Section).
Liberty Manufacturing Co., Jeannette, Pa., 132-134.
Lincoln Electric Co., Cleveland, Ohio, (Norvell-Wilder Section).
Linde Air Products Co., New York, N. Y., 117-119-121.
Link-Belt Co., Chicago, Ill., 334-336.
Locomotive Finished Material Co., Atchison, Kans., (Mid-Continent Supply Section).
Lubrikup Co., Williamsport, Pa., 237.
Lucey Products Corp., Tulsa, 629-631.
Ludlow Valve Manufacturing Co., Troy, N. Y., (Mid-Continent Supply Section).
Lufkin Foundry & Machine Co., Lufkin, Tex., 642-743.
Lunkenheimer Co., Cincinnati, Ohio, 531-533.

M

McEvoy & Co., Inc., J. H., Houston, Tex., 701-702.
M. & S. Supply Co., Houston, Tex., 732-734.
MacClatchie Manufacturing Co., Houston, Tex., 318-320.
Masco, Inc., Chicago, Ill., 230.
Mengden & Sons Co., Houston, Tex., 636B-638.
Mepham Corp., Geo. S., East St. Louis, Ill., 213-215-217.
Merchants Photo Service, Houston, Tex., 716.
Mettler Co., Lee B., Los Angeles, Calif., 329B.
Mid-Continent Pump Supply Co., Tulsa, (Mid-Continent Supply Section).
Mid-Continent Supply Co., Fort Worth, Tex., 604-606-608-705-707-709.
Midwest Piping & Supply Co., St. Louis, Mo., (Mid-Continent Supply Section).
Miller Fuel Engineering Co., Inc., Houston, Tex., 409-411.
Mills Alloys, Inc., Los Angeles, Calif., 528-530.
Mine Safety Appliances Co., Pittsburgh, Pa., 331.
Muller Co., Fort Worth, Tex., 736-738.
Muther Manufacturing Co., Boston, Mass., 243-245-247-249.

N

National Tank Co., Houston, Tex., 108-110.
National Tube Co., Pittsburgh, Pa., (Mid-Continent Supply Section).
Naylor Pipe Co., Chicago, Ill., (Mid-Continent Supply Section).
Norvell-Wilder Supply Co., Beaumont, Tex., 404-406-408-410-412-414-416-418-420-422-505-507-509-511-513-515-517-519-521-523.

O

Oil and Gas Journal, The, Tulsa, 223-225.
Oil Center Tool Co., Inc., Houston, Tex., 204-305.
Oil Equipment Sales Corp., Houston, Tex., 510-512.
Oil Weekly, Houston, Tex., 426-527-529.
Osage Metal Co., Inc., Oklahoma City, Okla., 222-224.
Oster-Williams Tool Corp., Cleveland, Ohio, 226-228.

P

Patton Co., H. L., Houston, Tex., 133.
Patterson-Ballagh Corp., Los Angeles, Calif., 326-328.
Petroleum Association of America, Tulsa, 431-433.
Petroleum Electric Power Club, Houston, Tex., 718-720.
Petroleum Engineer Publishing Co., Dallas, Tex., 118-120.
Petroleum Iron Works of Texas, Beaumont, Tex., 310-312 (1,001 Outside).
Petroleum Reporter, San Antonio, Tex., 627.
Pierce Governor Co., Anderson, Ind., 736-738.
Pittsburgh Valve & Fittings Co., Barberton, Ohio, (Mid-Continent Supply Section).
Plibrico Jointless Firebrick Co., Chicago, Ill., 710.
Pollard Co., Harry, Corpus Christi, Tex., 529B.
Portable Rig Co., Houston, Tex., 201-202-300-301.
Price-Trawick, Inc., Stroud, Okla., 522-524-623-625.

R

Ratigan Co., J. P., Los Angeles, Calif., 212.
Ray Pressure Snubber Co., Charlotte, N. C., (Norvell-Wilder Section).
Rector Well Equipment Co., Fort Worth, Tex., 600.
Red-Rex Corp., Houston, Tex., 208.
Reda Pump Co., Bartlesville, Okla., 339.
Refinery Supply Co., Tulsa, 236.
Regan Forge & Engineering Co., San Pedro, Calif., 326-328.
Rieber Instrument Co., Los Angeles, Calif., 522-524-623-625.

S

Safety Equipment Service Co., Cleveland, Ohio, 543.
Scintilla Magneto Co., Inc., Sidney, N. Y., 708.
Service Pattern & Model Works, Houston, Tex., 432.
Service Recorder Co., Cleveland, Ohio, 243-245-247-249.
Shaffer Tool Works, Brea, Calif., 322-324.
Simmons Manufacturing Co., Cleveland, Ohio, 243-245-247-249.
Smith & McDannald Co., Houston, Tex., 732-734.
Smith Co., B. M., Los Angeles, Calif., 231-233.
Smith Separator Corp., Tulsa, 307.
Smith Welding Equipment Co., Minneapolis, Minn., 222-224.
Snetcher & Pittman, Inc., Oklahoma City, Okla., 122.
Southern Container Co., Houston, Tex., 115-117A.
Southern States Co., Inc., Dallas, Tex., 526.
Spang, Chalfant & Co., Inc., St. Louis, Mo., 227-229.
Specialty Oil Tool Co., Los Angeles, Calif., 620-721.
Sperry-Sun Well Surveying Co., Philadelphia, Pa., 338.
Stanley Tool & Level Plant Co., New Britain, Conn., 308.
Stone Oil Tool Co., Houston, Tex., 620-721.
Stover Manufacturing & Engine Co., Freeport, Ill., (Mid-Continent Supply Section).
Sullivan Machinery Co., Chicago, Ill., 143.
Superior Body Co., Lima, Ohio, 243-245-247-249.
Surety Rubber Co., Carrolton, Ohio, 308.

T

Taylor Instrument Co., Rochester, N. Y., 535.
Templeton, Kenly & Co., Ltd., Houston, Tex., 616.
Tennant Co., Houston, Tex., 304-306-406-407.
Texas Electric Steel Casting Co., Inc., Houston, Tex., 430.
Texas Iron Works, Houston, Tex., 201-202-300-301.
Texas Rubber & Specialty Corp., Houston, Tex., 309-311.
Thornhill-Graver Co., Houston, Tex., 428B.
Timken-Detroit Axle Co., Detroit, Mich., 243-245-247-249.
Trailer Co. of America, Cincinnati, Ohio, 243-245-247-249.
Transportation Equipment Co., Houston, Tex., 243-245-247-249.

U

Union Carbide Co., New York, N. Y., 123-125-127-129.
Union Chain & Manufacturing Co., Sandusky, Ohio, 624B-626.
Universal Core Barrel Co., Houston, Tex., 117B-119.
Universal Engineering Co., Ltd., Los Angeles, Calif., 506-508.
Universal Rod & Equipment Co., Los Angeles, Calif., (Mid-Continent Supply Section).

V

Vellumoid Co., Worcester, Mass., 218.
Vernon Tool Co., Los Angeles, Calif., 329.
Volz Engineering Co., Long Beach, Calif., 522-524-623-625.
Vortox Manufacturing Co., Claremont, Calif., 612.

W

W. G. B. Oil Clarotier Co., Kingston, N. Y., 243-245-247-249.
W. K. M. Co., Inc., Houston, Tex., 518-520-619-621.
Waukesha Motor Co., Waukesha, Wis., 201-212-300-301.
Welded Tank & Steel Co., Dallas, Tex., 332.
Well Equipment Co., Houston, Tex., 528-530-532.
Wessendorff Nelms & Co., Houston, Tex., 226-228.
West American Rubber Co., Los Angeles, Calif., 522-524-623-625.
Western Block Co., Lockport, N. Y., (Norvell-Wilder Section).

(Continued on Next Page)

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(Continued from Preceding Page)

Western Sand Banum Co., Inc., Houston, Tex., 402.

Wheeler Co., F. H., Chicago, Ill., 308.

Whitney Chain & Manufacturing Co., Hartford, Conn., 727.

Wickwire Spencer Steel Co., New York, N. Y., 231-233.

Williams Co., New York, N. Y., 613.

Williamsport Wire Rope Co., Williamsport, Pa., (Mid-Continent Supply Section).

Wilson Goggles, Inc., Reading, Pa., 308.

Wisconsin Axle Co., Oshkosh, Wis., 243-245-247-249.

Word Supply Co., Houston, Tex., 231-233.

Z

Zink Co., John, Tulsa, 139.

Complimentary tickets to the oil show can be secured by oil men only by applying to any of the exhibitors or directly to the Oil Equipment and Engineering Exposition, Petroleum Building, P. O. Box 490, Houston, Tex.

Additional Personnel of Producing Companies in the Gulf Coast Area

Aiken, H. C., care Walee Hotel, Houston, Tex.
Independent operator

Atlatl Royalty Corp., 1902 Esperson Bldg., Houston, Tex.
Pres., E. L. De Golyer
V. P., F. J. Winter
Sec., Pearl L. Jordan
Supt., W. H. Hodnett
Mgr., Land and Leasing Dept., K. K. Knopp
Ch. Geol., K. D. Owen

Cameron, A. A., Second National Bank Bldg., Houston, Tex.
Individual operator

Chicago Gulf Oil Corp., Edna, Tex.

Coyle, Ben, Petroleum Bldg., Houston, Tex.
Independent operator

Felmont Corp., 1902 Esperson Bldg., Houston, Tex.
Pres., E. L. De Golyer
V. P.s, Sumner Pike, 120 Wall St., New York City; W. H. Hodnett
Treas., Robt. P. Bramley, 120 Wall St., New York City
Sec., Harry A. Richards, 120 Wall St., New York City
Supt., W. H. Hodnett
Mgr., Land and Leasing Dept., K. K. Knopp
Ch. Geol., K. D. Owens

Hoffman Dome Development Co., 2108 Second National Bank Bldg., Houston, Tex.
Pres., C. G. Hamill
V. P., John Mendlovitz
Sec.-Treas., W. D. Sutherland

Jones, J. T., 1203 Drexel Ave., San Antonio, Tex.
Individual operator
Drlg. Supt., J. T. Jones
Farm Boss, J. E. Jones, Route No. 1, Box 168, Adkins, Tex.
Mgr., Land and Leasing Dept., J. T. Jones
Ch. Geol., Chas. N. Jones, 211 Congress Ave., San Antonio, Tex.

Justa Petroleum Corp., 1307 Esperson Bldg., Houston, Tex.
Pres., R. A. Stamey
V. P., S. A. Judson
Sec.-Treas., Doyle Smith

Kirby Petroleum Co., 1103 Kirby Bldg., Houston, Tex.
Pres., George Sawtell
Chm. Bd., John H. Kirby
V. P. and Treas., John T. Scott
Drlg. Supts., Joe Stein, Route 2, Overton, Tex.; Pat Tatum, Big Spring, Tex.
Mgr., Land and Leasing Dept., Wm. T. Hancock, Jr.
Geol., Wm. T. Hancock, Jr.
Ch. Egr., L. Thorold

Long, F. M., 2404 Esperson Bldg., Houston, Tex.
Individual operator

McCaleb, Nichols, 2201 Bernard, Houston Tex.
Independent operator

Sloan, T. J., 2305 Esperson Bldg., Houston, Tex.
Independent operator

Smith, Horace M., Corp., Bay City, Tex.
Pres., Horace H. Smith

Stone, E. H., Second National Bank Bldg., Houston, Tex.
Independent operator

Victoria Oil Corp., 1305 Sterling Bldg., Houston, Tex.
Pres., H. R. Cullen
V. P., Harry Holmes
Sec.-Treas., Roy G. Cullen

Wallace, D. M., 2209 Second National Bank Bldg., Houston, Tex.
Independent operator
Field Man, Earl Harris, Many, La.

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Inadequate Control Is Due to Unpreparedness

(Continued from Page 135)

full load of fluid on the bottom of the hole at all times. After setting back the first four fourbles of pipe, it is prescribed that the kelly joint shall be made up on the drill stem and the drilling fluid in the hole reconditioned.

Perhaps the ultimate refinement of safety conception, and one that is by no means as bizzarre as it might at first appear to an operator unfamiliar with the Gulf Coast area, is reflected in Rule 21 of the Railroad Commission's orders governing the Greta Field: "Any water well hereafter drilled in the producing area or extensions thereof, shall be required to run Grade 'A' pipe and cement from top to bottom. Well shall be tubed, and tubing set on a welded head. Control valve on tubing shall be of 1,000-pound test."

Many a noble crater on the Gulf Coast had its humble origin in an otherwise innocent water well!

Air filters whose reported efficiency of 99.9 per cent on 10 micron size dust is based on the dust count method are described by the Coppus Engineering Corp., Worcester, Mass., in two new bulletins. No. F-320-3 describes the Coppus unit type filter for motor and generator intakes, and general commercial and industrial ventilation. No. F-310-2 contains complete data on filters for air compressors, internal combustion engines, etc.

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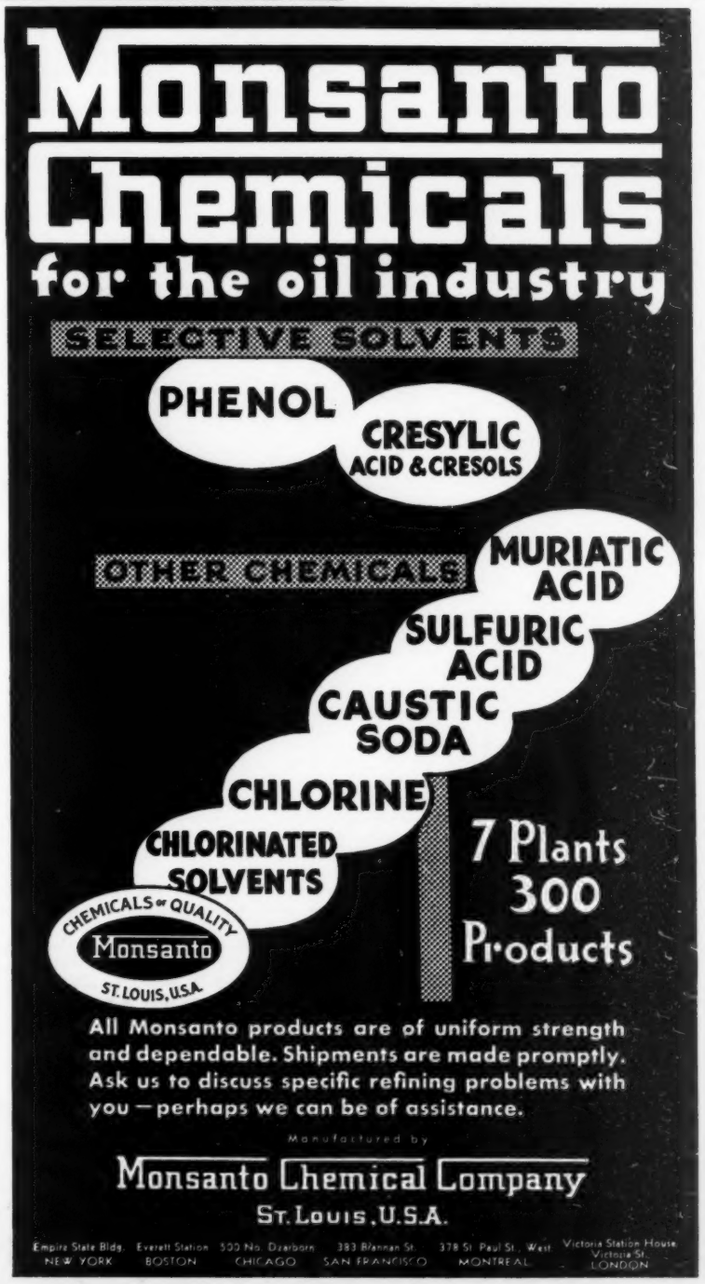
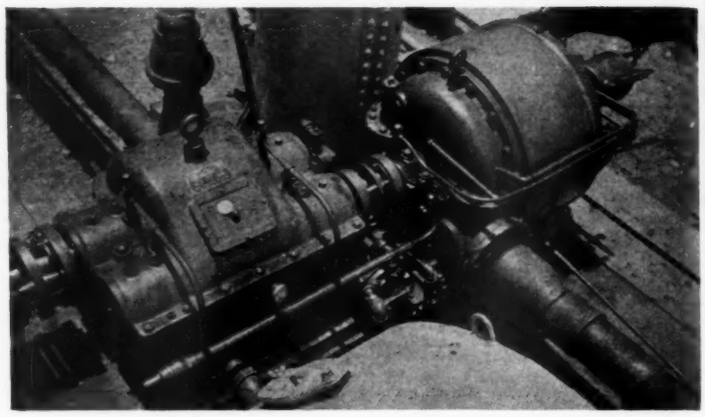


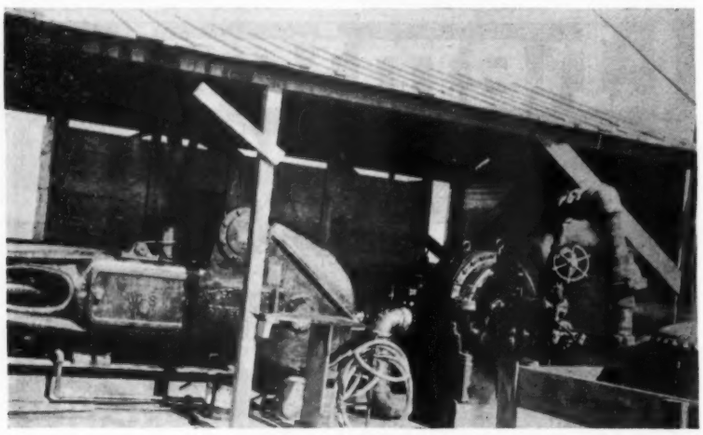
Steam Turbine Driven Mud Pump Using V Belt for Power Transmission



The steam turbine drives the slush pump through a reduction gear, (right). This is a part of a major company installation on the Gulf Coast

Application of steam turbines to the power end of mud pumps is an innovation of the past couple of years, which is finding a very definite place in Gulf Coast drilling practices. Deeper drilling, bringing into use heavier equipment and necessitating the handling of greater loads, has increased power requirements to such an extent that the conservation of available power is an important phase of operation. Turbine installations on the coast to date have accomplished notable savings along this line by higher efficiency in the utilization of steam and the consequent lowering of fuel consumption.

One of the well known major oil companies on the Gulf Coast has had four of these turbine driven mud pumps in service the past year and reports savings of approximately 35 per cent on the amount of steam required compared to the cost of operation of the conventional type of mud hog used in the same service. Accurate comparisons have been made possible due to the fact that the rig setup in each case has included a turbine driven slush pump on one side and a conventional steam driven mud hog on the other. Throughout the drilling period of each setup, operations were shifted from one unit to the other to make comparisons of operations at various depths of drilling and various pump pressures required.



Installation of steam turbine driven slush pump on one of major company's operations on the Gulf Coast

Flexibility of the design is an important feature of these units. This refers not only to the turbine equipment but to the power pump as well. The power pumps have been so selected that they can be used practically without change either on these turbine driven applications or for motor drive or gas or oil engine drive, wherever good judgment indicates this selection. This is done by the use of a 250-r.p.m. pulley mounted on the drive shaft of the power pump which is driven by Gates V-belt from the turbine, motor or engine as the case may be.

In this way the engineers in charge of the job have reduced their capital investment to a minimum and have provided themselves with a flexible arrangement whereby they can select whichever type of equipment is most economical for the particular job. In general, the driving pulley from the power equipment turns at 900 r.p.m. and is then belted down to the 250-r.p.m. power shaft on the power pump. Where drilling operations are adjacent to electric power available at low cost, a standard 900-r.p.m. motor with V-belt pulley can be used and similarly engine drives can be applied to the same pump.

Steam turbine drive immediately suggests itself for new drilling operations in unproven territory. Once a field has been brought in and particularly when there is excess gas available savings in fuel to the boilers becomes an unimportant item and the conventional mud hog again enters the picture.

No operator today need be told that savings of one-third in the fuel required for furnishing steam to the mud pumps is a tremendous item. This is particularly important now when measured in terms of holes 6,000 feet and deeper. Ordinarily, fuel savings from equipment can be found only when the fuel bills are finally separated. On this equipment, however, the savings are so marked that they show up immediately in the operation of the oil field boilers.

It has been possible to carry the load in every case with much easier firing on the boilers and in some installations it has been possible to shut down one boiler entirely, due to the savings in steam requirements by the turbines. On one installation in particular, it was necessary to tie in on a gas line which was none too large for the demand. It was impossible to maintain steam pressure with the conventional mud pumps but no difficulty at all was encountered in carrying full steam with the turbine driven unit.

In the design of these power units, it must be borne in mind that for steam turbines to operate at best efficiency, they must be designed for relatively high rotative speeds, whereas as outlined above, the pulleys on the power pumps operate at 250 r.p.m. and for the sake of flexibility the same size and type of 900 r.p.m. pulleys are used on the turbine driven equipment as on the motor units.

The several installations which we have referred to have been designed and furnished by the Moore Steam Turbine Corp. Each unit consists of a 250 horsepower 3,600 r.p.m. Moore five-stage Type S-4 steam turbine. These are designed to take steam at the throttle at 300 pounds gauge pressure with 100 degrees superheat and exhaust to atmosphere. The speed of 3,600 r.p.m. is then reduced to 900 r.p.m. through Moore double helical herringbone type reduction gears. Thomas flexible couplings are furnished both on the pinion and gear shaft and a 14-groove V-belt pulley for power takeoff is mounted on an extension shaft held between two pedestal type bearings.

Automatic lubrication is provided for the entire unit. A specially designed welded steel bed-plate serves to support the entire unit and a portion of this bedplate is arranged to provide an oil reservoir of more than 30 gallons. A small gear type oil pump is built into the main gear case, takes suction from the oil reservoir within the base, and provides forced feed lubrication to all of the turbine and gear bearings. A small Andale tubular type oil cooler, also mounted on the turbine base, continuously cools the circulating oil.

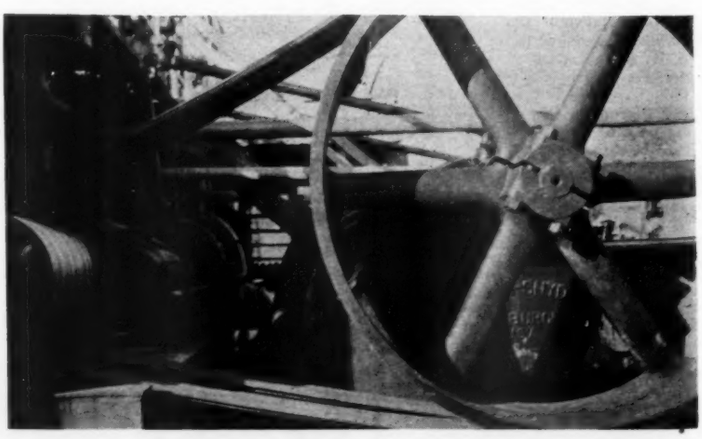
The turbine is simple and rugged in design. The steam after leaving the throttle valve passes first through the constant speed regulating governor valve and then through the emergency overspeed governing valve and into the turbine nozzles. The function of the nozzles is to convert the pressure energy of the 300-pound gauge steam pressure at 100 degrees superheat into velocity energy which is then absorbed in five stages of the turbine.

The multistage turbine has obvious advantages in that it not only develops power at high efficiency but, by absorbing the velocity energy in several stages, reduces the velocity steam across the turbine bucket so that there is practically no cutting out of the buckets due to erosion of high velocity steam as would be the case if a multistage design were not used.

The governing mechanism is simple, consisting primarily of two weights, operated by centrifugal force against a spring set to control the speed of 3,600 r.p.m. This centrifugal action is transmitted to the main governor valve, any tendency towards increasing the speed resulting in the governor valve automatically throttling and holding the speed at the desired point. On the other hand, if the speed should start to fall off, the action of the governor is instantly to open the main governor valve.

It is immediately apparent that at speeds below normal the main governor valve will be wide open. Accordingly, when it is desired to operate at below normal speed, this is done by throttling ahead of the turbine. While it is possible to provide variable speed governors for this work, such as are regularly furnished on other types of installations, good judgment indicates that these oil field installations should embody only the simplest and most rugged type of governing mechanism.

When a steam turbine is operated by hand throttle in this manner, at reduced speed, the efficiency is reduced for the very simple reason that what the operator is doing is to cut down the amount of steam pressure available at the turbine nozzles. If it were necessary or possible to operate these machines at anything like full load and full speed, the steam consumption would be less than 30 pounds of steam for each developed brake horsepower.



Belt drive from reduction gear to slush pump on a steam turbine driven slush pump installation on the Gulf Coast

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Logging Machinery Principles Are Adapted to Unique Type Rotary

HOUSTON, Tex., Apr. 1.—Embodying a number of mechanical principles which for years have been utilized successfully in the design and construction of heavy logging machinery in use in the Pacific Northwest, a new and decidedly unique rotary drawworks and power transmission unit has been undergoing break-in tests in a Houston shop. It is owned by the Steen Drilling Co. and is scheduled to be set up and put in operation on a Gulf Coast location in the near future.

Appearance of the drawworks in the Houston area, by virtue of its radical departure from traditional drawworks design, its size capable of absorbing smoothly and without shock all loads imposed by 10,000 to 12,000-foot drilling, and its various special features including full control by compressed air, has attracted a host of visiting oil men from engineering and production departments of various companies and from the fields.

Suggested by Logging Machinery

The machine was designed by Harry L. Turney of Los Angeles and was constructed by the Washington Iron Works of Seattle, Wash. The designer has been identified with the manufacture of heavy machinery, especially heavy logging machinery, for many years, and controls many patents which have been used almost universally in various phases of the latter industry. When the lumber industry declined to low ebb during the depression, Mr. Turney directed his attention to the possibilities of applying some of his patents and ideas to the design and construction of machinery for the oil industry.

Perhaps the outstanding feature of the new type of drawworks is the mechanical means employed to obtain drum speed changes, as well as rotary drive speed changes. Instead of the conventional jaw clutches, a unitary system of band clutches is incorporated in a shielded and dust-tight housing behind the drawworks. This unit permits the driller to change the speed of the drum instantly to a higher or lower speed while under full load and with engine running at high speed. This is accomplished by a series of specially designed, air-operated band clutches controlled by a single valve.

The drum also is equipped with air-operated brakes of special design, controlled by a patented variable air pressure valve, making it possible to apply or set the brakes with pressure of from a few pounds to full tank pressure. The single line speed of the drum is variable from 335 feet per minute in low gear to 2,160 feet per minute in high gear.

Air-operated band clutches of the same type as used in the transmission are a part of the rotary drive. These can be reversed instantly under full speed and load. Speed variation of the table is from 15 r.p.m. to 200 r.p.m. The drawworks is adaptable for use either with steam, turbine, electricity, natural gas, gasoline, or Diesel engines.

The machine now being "run-in" at Houston is equipped with two 300 horsepower Waukesha Hesselman oil engines, making available a full 600 horsepower if it is desired to use both while pulling long strings of pipe. The Steen Drilling Co. also has added two 18-inch Wilson-Snyder power pumps, driven by V-belt connections with the rig. This equipment makes it one of the heaviest Diesel powered rigs ever to be placed in the Gulf Coast area.

Easy Setting Up

The machine may be torn down into five units for moving from one location to another. Any one of the units weighs several thousand pounds less than one of the big power pumps. The whole rig was designed for easy setting up which may be accomplished in a day.

The frame of the drawworks is fabricated of structural steel, I-beams being electrically welded at each joint, forming a rigid and strong foundation for engines, transmission and drum.

Except for the conventional rotary drive chain, all transmission of power is effected either through heavy gears or V-belts. The drum is gear driven directly from the transmission, as shown in an accompanying layout plan-view of the machine. All gears are of the electric open-hearth steel, helical cut from solid blanks. The power take-off pinion and gear are of the herringbone type running in oil in an oil-tight case to eliminate excess wear from dust and grit.

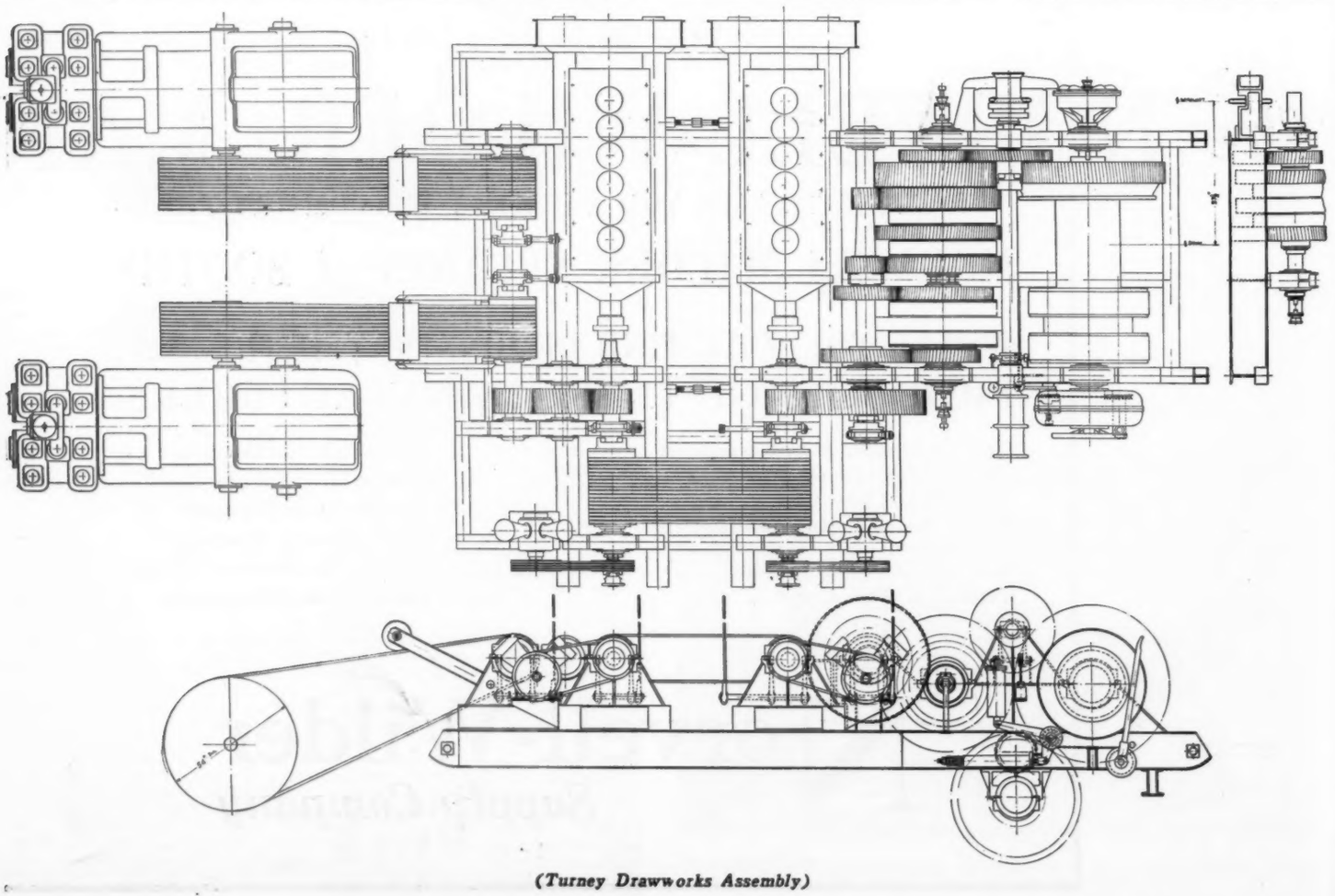
The drum is of open hearth steel, accurately turned and balanced. The barrel is 25 inches in diameter and 34 inches long, equipped with two special heat-treated steel brake flanges 46 inches in diameter with 9½-inch face. A special air actuated V-type clutch is used to lock the drum with the driving gear, controlled by the patented variable pressure operating valve for smooth locking and releasing under load.

Line speeds and line pulls have been worked out with a view of obtaining maximum output of horsepower of the engines, based on tabulation of data collected over a period of many years to meet the average oil well drilling conditions. The control valve has a neutral position for idling, with four fixed positions, one for each speed so that the driller may select any one of the four speeds desired at will. It is impossible to apply two clutches at one time. The clutch bands are faced with a special high grade lining to give long life.

The drum brakes are lined with special duty brake lining.

As previously mentioned the engines are so arranged that by engaging clutches, full power of both engines may be used for drawworks in coming out of hole. The hook-up of clutches also is such that full power of both engines may be used when compounding pumps, and it also is possible that either engine may be used for drawworks or pumps, or both. The mud pump hook-up also is such that either or both pumps may be used.

Bearings for the pump drive shaft are mounted on the engine skids. To take up slack in pump belts an adjustable idler is provided so the pumps may be fixed to foundation. The outer frame used to carry the two power take-off shafts is bolted to the side member of the draw-



(Turney Drawworks Assembly)

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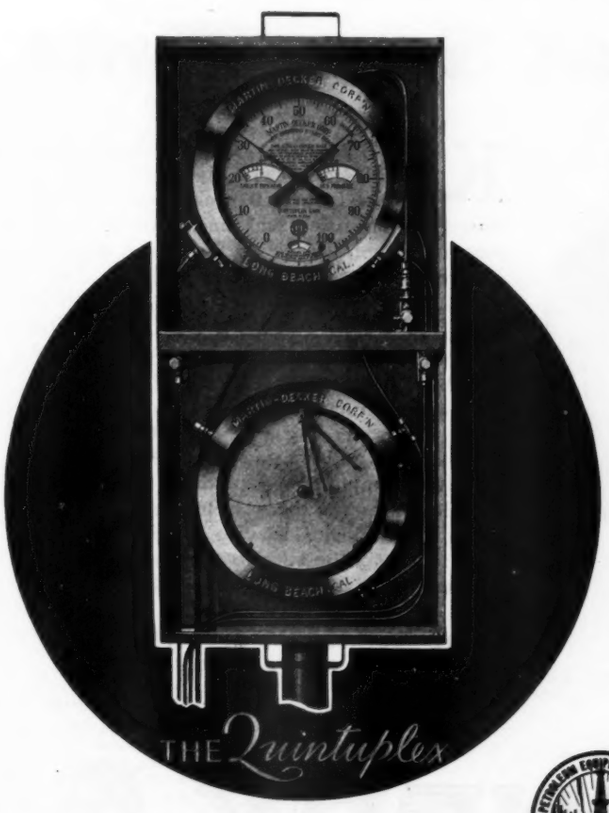

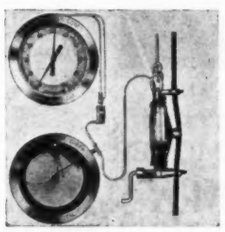

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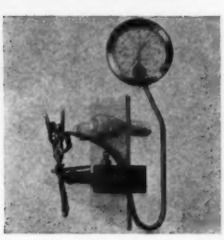

THE "MARTIN-DECKER" ROTARY TABLE TACHOMETER shows the number of turns the table makes in a minute. Some really surprising reductions in 'cost and time per foot of hole' are being accomplished by study of the relation of weight and speed to different formations. This Tachometer is simple and sturdy, and can be installed and calibrated quickly on any rotary table.

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These instruments are described more fully in our booklet, "Drilling Control." If you care for a copy we will be glad to send it wherever you direct.

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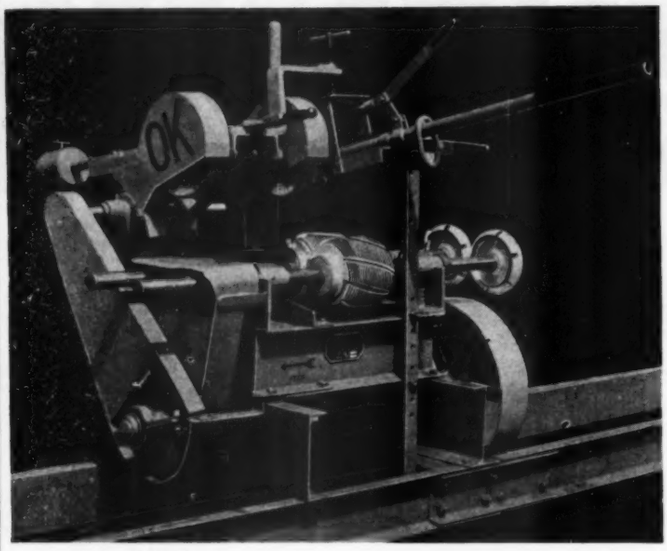

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All shafts are of large diameter made of special heat treated steel. The cathead shaft may be equipped with any make cathead.

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Two compressors, one a standby, are furnished for the air operated clutches and brakes. This equipment also includes one 30-inch by 10-foot air receiver or tank with a working pressure of 100 pounds.

Gulf Coast Fields in Sediments of Late Age

(Continued from Page 38)

overlaying formations are soft enough to be pushed aside by the salt where it is compressed sufficient to cause flow and also where there is subsurface pressure enough to force the salt upward through the strata. This necessary combination of conditions prevails abundantly in Southeast Texas and southern Louisiana and in the Tyler Basin. Southwest Texas is favored only in spots hence many salt dome fields should not be expected there. The Mississippi Valley seems to present the greatest unexplored area in the Gulf Coast region.

Oil and gas is reservoired about the domes. As the salt pushed upward it domed the formations over the top and tilted them along the sides as shown in the accompanying cross section of a dome and tilted the beds along the sides thus making structures in which the oil and gas has been accumulated above the salt water, but could not escape; hence there is oil where there are porous sand beds over the top or in the porous caprock over the dome. Deeper pay is found in the tilted beds around the dome as shown in the cross section illustration. The pay sands are often numerous. As an example at Goose Creek pays are at 1,100 feet, 2,200 feet, 2,500 feet, 3,000 feet, 3,300 feet, 3,400 feet and 4,500 feet. At present the maximum depth at which the pay will be found has not been determined; there is still a possibility of pay as deep as the drill can be driven down.

The size of the wells varies with depth, thickness of sand, and other conditions. Generally the shallow wells are not the large ones. Shallow wells came in for from a few to several hundred barrels but the deep ones are rated in the thousands. No. 1 Abrams, at West Columbia, came in for 30,000 bbls. and in the first 76 days produced 1,275,000 bbls. The flow of the oil is occasioned by the gas with the oil and by the artesian pressure. The artesian pressure is the most important force which keeps the wells flowing and cleans most of the oil from the sands. It causes a slow natural water flooding and if the oil is not drawn off too fast it maintains bottom hole pressure. The best operators now plan to take off the oil only as fast as the artesian water can follow the oil into the pool. The plan is to keep the balance between outgo of oil and income of the following water thus holding the natural pressure. The cause of the artesian water table is shown by the cross section from Waco to Houston and Galveston, Figure 2. The water fills the strata from the outcrop on the north and follows the formations downward to the domes and raises below the oil and gas. The pressure results from the weight of this whole column of water from the outcrop to the dome. It has a tremendous head but cannot move fast through the sand, hence if the oil is taken off too fast the wells go down below the flowing stage and must be pumped. The total amount of the oil accumulated in the domes is immense. As an example, Conroe which was discovered in December, 1931, has produced to the end of 1934, 41,376,299 bbls. and one engineer estimates that this pool will flow 20 years and will produce 375,000,000 bbls. Conroe is a good example of the handling of the more recently discovered pools where the flowing pressure is conserved by not drawing off the oil faster than the artesian water can follow. Apparently the water can follow at Conroe at the rate of 40,000 to 50,000 bbls. per day making it possible to flow that much oil for many years without decline of bottom hole pressure.

There is a great range in the character of the oils. In general they are not as high in gasoline as Pennsylvania and Mid-Continent oils but have a large per cent of medium and heavy lubricating stock. They range in gravity from 14 to 39 A.P.I. though most are between 25 and 33. Practically all of the oil has some sulphur and some more than 2 per cent.

Geophysical Methods

The finding of the domes has developed into a real science. The first domes discovered were on the "hills" which are really only slight elevations in the otherwise flat coast country. These surface domes are generally circular hills only a few feet high but very noticeable in excessively wet weather when they are dry while the surrounding country is under or dotted with pools of water. Spindletop is less than 20 feet high, while Barbers Hill and Damon Mound, the highest ones, are less than 50 feet above the plains. Most of them like Humble and Goose Creek have no noticeable elevation but were discovered from oil or gas seeps. Within the last few years scientific methods of finding the domes have been introduced. The gravity method (pendulum or torsion balance) was the first instrument to be used. This depends on the difference of pendulum swing due to gravity. Since salt is lighter and has less gravity pull than the surrounding rocks there is a retarded pendulum swing when the instrument is over that substance. The method of operation therefore is to locate the instrument at regular intervals in the field to determine the swing or gravity. When an area of low gravity is found it is assumed the substance below is salt in a salt dome. The area of salt is then outlined by observations at frequent locations. The results then depend on drilling.

More recently the "shooting" method prevails. This depends on the rate of travel of sound through the earth and the reflection of the sound wave from some more or less flat surface like the echo travels through the air. The seismograph instruments for the recording of these sound waves are set up in the field and recording connections made over a section or more. Small holes are dug in the ground 20 or more feet deep and loaded with dynamite. When all is ready the holes are shot to create the sound wave. The instrument records the start and time of return of the sound. The places of shortest return of the sound are assumed to be less deep or "highs" underground. The highest places are the tops of the domes. This process is slow and expensive but is giving good results. The torsion balance and the seismograph have revealed many domes which would otherwise have remained hidden, in fact most of the domes shown on the map are the result of the geophysical work.

A dome is the best place to drill but not all domes contain oil. The real reason has not been finally determined but it must depend on the source of the oil. If there is no source oil in the vicinity of the dome it cannot be reservoired there no matter how favorable the dome structure. The oil can come from one of two sources, namely, deep seated strata or the shales surrounding the domes. If the oil comes from the surrounding shales as most geologists think, then the dry domes are in areas where there are no oil forming substances in the shale; likewise if the oil comes up along the plug from 10,000 feet or greater depths, then the plug must be in an area where there is no oil.

There are certain fundamental considerations of the source of the oil which are of prime importance to the searchers for oil in the coast country. If the oil comes from the shales then some of the oil should be reservoired in structures other than salt domes.

There are old shore lines like the present shore line shown on the map or like East Texas where the oil might be reservoired. Practically all of the coast territory formations are shore line deposits which may have favorable reservoirs. However, the search has been directed almost exclusively for the salt domes. The domes are small structures which have reservoired the oil in the immediate vicinity. On the map they seem to blanket the whole area but if drawn to scale they are mere pin points and there are far greater opportunities for oil to escape between the domes or the reservoir in sand lenses than to be trapped at the domes. Certainly the reservoirs outside the domes merit greater attention than has been given them.

Likewise Southwest Texas where there are fewer domes should have many oil pools in sand lenses, in structures and along fault planes. All of these types of structures are prevalent there.

If, as has been suggested, the oil comes from deep seated strata then there are tremendous reservoirs waiting for the deeper drilling. Consideration of either source indicates that tremendous undeveloped reserves of oil may exist in the Gulf Coast country.

Interested in Holding Company Legislation

(Continued from Page 41)

Tap any new source of supply of electrical energy or gas.

Abandon any part of its facilities or service.

On the other hand the companies must on any reasonable request and in the manner prescribed by the Commission:

Make extensions, repairs, improvements, etc., or changes in its facilities.

Establish physical connections with the facilities of any other person or persons.

Permit the use of its facilities by any other person or persons.

Utilize the facilities of any other person or persons.

Sell electrical energy or gas to, purchase electrical energy or gas from, transmit electrical energy or gas for and exchange electrical energy or gas within any other person.

All financing has to be approved by the Securities and Exchange Commission. This Commission under the Act will handle all matters having to do with securities, acquisition of property, payments of dividends, retiring of indebtedness, making purchases from and contracts with non-affiliated interests and operating companies must comply with all regulations as to forms of accounting and reports. This Commission has the important power of interpreting what operating properties are essentially related geographically and economically and issue permits to continue as a holding company on this theory.

In brief some Federal Commission will act as final judge in matters pertaining to practically every phase of operation from plant details to bookkeeping methods and rate making. It is needless to explain what this means to the investors. Proponents of the measure take the position that in abolishing the holding companies the investor in these units will lose nothing as it will be transferred to an investment in the operating companies on the basis of the actual value. It is apparent that it cannot be worked out on that basis. There are hundreds of millions of dollars of bond investments in these holding companies in addition to the common stock equities.

In the time allotted there can be no fair transfer of these investments or an

Trading in Crude Oils and Gasolines Futures on the Commodity Exchange

NEW YORK, Apr. 1.—Following is a summary of the trading in gasoline and crude oil futures on the Commodity Exchange during the past week:

Gasoline Futures

Gasoline futures on Commodity Exchange, Inc., advanced 33 to 49 points. The market was fairly active, trading a total of 2,016,000 gallons, of which 1,428,000 gallons were traded in in the June delivery. The latter sold at a new high price of 6.06 cents per gallon (federal tax included). Quotations were firm throughout the week under review and advances were recorded at the close of each trading session.

Crude Oil Futures

Crude oil futures on Commodity Exchange, Inc., advanced 1¼ cents in all deliveries. Sales totaled 20,000 bbls., involving the July delivery at $1.20½ per barrel. Quotations were firm throughout the week under review, with today's closing prices approximately the highest for the week.

TRADING IN GASOLINE AND CRUDE OIL FUTURES

March 23 to March 30

GASOLINE

	Close a week ago	Close today	High for week	Low for week	Sales (gallons)
June	5.72 B	6.06 T	6.06	5.75	1,428,000
July	5.75 B	6.13 B	6.10	5.90	336,000
August	5.85 T	6.17 B	6.10	6.10	84,000
September	5.85 B	6.22 B	5.98	5.98	168,000
October	5.86 N	6.25 N	....	....	....
November	5.86 N	6.28 N	....	....	....
December	5.87 B	6.30 B	....	....	....
January	5.89 N	6.35 N	....	....	....
February	5.91 N	6.40 B	....	....	....
				Total:	2,016,000

The above prices for future delivery of gasoline are ex-licensed tanks in delivery areas and include 1-cent-per-gallon federal tax.

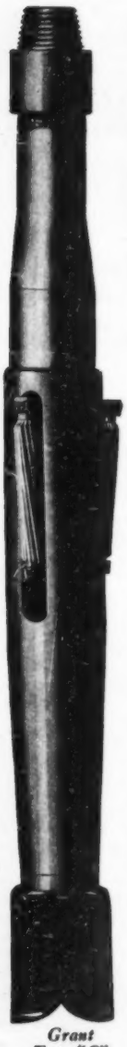
CRUDE OIL

	Close a week ago	Close today	High for week	Low for week	Sales (barrels)
June	1.19 B	1.20¼ B	....	....	....
July	1.19 B	1.20¼ B	$1.20¼	$1.20½	20,000
August	1.19¼ B	1.20½ B	....	....	....
September	1.19½ B	1.20¾ B	....	....	....
October	1.19¾ B	1.21 B	....	....	....
November	1.20 B	1.21¼ B	....	....	....
December	1.20½ B	1.21¾ B	....	....	....
January	1.20¾ N	1.22 N	....	....	....
February	1.21 N	1.22¼ N	....	....	....
				Total:	20,000

B—Bid. T—Traded. N—Nominal.

MAKE A NOTE NOW TO VISIT—

BOOTHS 220 & 321 AT THE OIL EXPOSITION



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They'll contain equipment EVERY operator can use to his PROFIT!

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orderly liquidation through sale. Under the control proposed, these operating units no doubt will lose much of their attractiveness from the standpoint of investors and this fact further jeopardizes the position of the owner of holding company securities. Added to this is the fact that municipalities can build and operate their own plants without the restrictions placed on the privately owned operations.

It is assumed that in order to justify the entire plan the Government's Commission will bring about lower rates to consumers. In the electrical end there is a tie-in with the Tennessee Valley and other Government hydroelectrical generating projects. In this connection the Government could build new transportation systems for natural gas and through the power vested in the act bring about substantial changes in present pipe line operations, and distributing systems.

Natural Gas Situation

In regard to natural gas, it is felt that the conditions back of this operation as a public utility are so basically different from those of electric power and light, that it is unwise to attempt to operate under the same general principles as provided under Rayburn bill. This situation is to be stressed at the hearings under way at Washington.

As is generally known in the oil business the natural gas business from the production and transportation ends, has developed largely as a supplementary operation to the oil industry. Individual companies have found gas when they drilled for oil and there are varying quantities of gas produced with oil in a great majority of oil wells. To provide outlets for this gas large investments have been made by a few companies and this in turn has provided additional revenue for producers of crude oil and has played a part in the conservation of this natural resource.

It is pointed out that most of these important natural gas projects which have transported the gas to large consuming centers located in all parts of the country except the extreme east, from fields located several hundred miles distant, have been completed over the past 10 years. These projects are different from other public utility expansions. It usually requires years to develop outlets for major lines and there is also always the danger of early exhaustion of field supplies. It is safe to state that most of these large projects, some of which have been completed during the depression years, would never have been carried through except for the willingness of major oil and affiliated interests operating under the holding company principle, to hazard large capital expenditures. The separation of these operations as will be necessary under the Rayburn act will not only work a great hardship on the oil and natural gas interests involved but it is equally certain that future expansion to serve new customers will not materialize.

Reid Vapor Pressure Must Be Controlled

(Continued from Page 60)

general, the refiner controls the vapor pressure according to the atmospheric temperature and the type of equipment in which the fuel is to be used. It is possible that this degree of control will always be necessary. By reducing vapor pressure to a low value, vapor lock can be eliminated almost entirely in very hot weather, even with the present-day design of fuel systems. During the spring and fall, however, it is difficult to eliminate vapor lock in current cars, because a compromise is necessary between vapor pressure and ease of engine starting due to the variability of weather conditions.

Regardless of automobile design, the gasoline marketer cannot afford to sell unsatisfactory motor fuel in this respect, since it would not be favorably received by the motoring public. To produce such fuel, it is necessary to throw away the most valuable portion of the gasoline, butane, and this is uneconomical because this fraction has already entered into the manufacturing cost of the fuel. Good operation in the great majority of cars today only permits a Reid vapor pressure of 8 pounds at temperatures below 100° F., and 12 pounds for temperatures below 75° F. Such conditions force the butane fractions, which are ideal in motor fuels, into a low grade fuel market, in competition with coal, gas and oil.

It may therefore be concluded that the greater the ability of the refiner to control the vapor pressure of his product, the greater will be his economic gain. At present, most gasoline is actually the result of blending together several gasolines. Unfortunately, the refiner has no continuous or exact control over the vapor pressure of these gasolines when manufactured, but must rely on periodic inspections of the laboratory. The results of such tests are available to the operator, hours, and even days, after the samples were taken, and consequently, production is carried on without proper guidance. This blind operation often results in the run of gasoline being markedly off specification, which requires special treatment during the blending operation in order to produce a final product meeting specifications.

A decided advance has been made in the technique of this vapor pressure control by the placing on the market of a device which continually samples and automatically records the vapor pressure of the product. As a result, the operator need no longer be compelled to blend blindly, but can refer to his chart of vapor pressure just as he now refers for guidance in distillation to his chart of pressure and temperatures.

C. B. Nolte Advanced to Presidency of Crane Co.

C. B. Nolte, for the last three years a director and member of the executive committee of Crane Co., was chosen president of that organization at a meeting of

C. B. NOLTE

the directors in Chicago March 26. He succeeds John B. Berryman, who was made chairman of the board.

After receiving his bachelor of science degree in mechanical engineering at the University of Illinois in 1909 Mr. Nolte entered the service of Robert W. Hunt Co., consulting, testing and inspecting engineers. Successively he became division manager, manager, vice president and general manager, and in 1930 president and general manager. This latter post with the Hunt organization he continued to hold till he was elected to his new office in Crane Co.

Mr. Nolte is a member of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Testing Materials, American Railway Engineering Association, Western Society of Engineers, and Pacific Railway Club.

Reports presented at the annual meeting of Crane Co. showed that operations had been put on a profitable basis in 1934.

Chicago Refined Oil Market Far More Optimistic Than For Many Months

By SPECIAL CORRESPONDENT

CHICAGO, Apr. 1.—The start of April finds gasoline in a market that is decidedly a seller's affair. The talk is all of higher prices, not only for the tank car market, but for tank wagon-service station as well. Sentiment here is decidedly bullish and it is difficult to find available gasoline to purchase at this time, except at considerably higher prices. Most of the carlot marketers have been scouring the sources of supply for limited amounts of material, without any general success.

Jobbers, it is true, have not yet quit their reticent buying policy but it has been hoped that they would enter the spot market soon on a good scale. It is figured that their stocks are quite slim despite fairly good orders against contracts which have been reaching refiners for some time now.

Little Offered

Third-grade gasoline seems to be perhaps even a shade firmer than regular grade, although both are strong. There is little material offered readily in the market. It is reported that while some refiners have fairly large accumulations of both grades, they wish to sell it only on the basis of a fair profit which it is generally agreed will involve prices still higher than those now ruling, despite the advances of the last few weeks. Tank wagon and service station prices are in general in good shape. Recent improvements in Michigan have aided in clearing up the largest single difficulty. Additional general advances are now considered a strong possibility.

Kerosene is beginning to firm up again, with some interesting growing. The anticipated demand has been slow in getting under way. Higher prices are being predicted for the early future. Instructions are coming in fairly well. Accompanying this is a show of much interest in tractor distillates. Actual demand for the latter is still somewhat limited. Farm consumption of these products this spring is expected to be heavy, all in all.

Furnace Oils

Even with the lateness of the season, a fairly good demand is still trickling in for furnace oils, and prices are still reasonably firm on most grades. Offerings now are not very burdensome, in contrast with the situation a few weeks ago, most sellers turning their attention elsewhere.

Lubricants

Lubricating oils are quiet, but reasonably firm at this time. Offerings seem to be limited and purchases fairly good.

Naphthas

Despite irregularity in offered prices of some naphthas and solvents, most sources are quoting products unchanged all along the line. Tank wagon prices are firm after recent reductions.

Coke

Coke is slow, but steady. Seasonal conditions are governing this market. Tone of the product is healthy.

Gas and Fuel Oils

There is a marked scarcity of industrial gas oil, a fact which is shooting the price higher. Gas companies are in the market but find it difficult to obtain the material they need. The heavy fuels are marking time, but are now firm and the commitments of the large consumers over the second quarter appear to be decidedly encouraging, although on a slightly lower price basis than the first quarter.

Wax

There is a slightly better tone in waxes here. Buying has not turned greatly larger but offerings are less unwieldy. Inquiries seem a little better at this time.

Crude Oil Prices

(Continued from Page 57)

Humble Oil & Refining Co. and Texas Co. Effective September 20 in Salt Flat by Shell Petroleum Corp.

Rocky Mountain States

Iles, light (Sept. 29, 1933)	$.96
Iles, heavy (Sept. 29, 1933)	.90
Florence, Colo. (June 17, 1933)	.80
Fort Collins and Wellington, Colo. (June 17)	(See Salt Creek prices)
Big Muddy (Sept. 29, 1933)	1.01
Frannie, light (May 1, 1934)	.70
Frannie, heavy (Sept. 29, 1933)	.62
Salt Creek and LaBarge (Sept. 29, 1933)	
See Stanolind Mid-Continent price schedule	
Grass Creek, light (Sept. 29, 1933)	1.18
Grass Creek, heavy (Sept. 29, 1933)	.62
Elk Basin (Sept. 29, 1933)	1.18
Rock Creek (Sept. 29, 1933)	1.02
Lance Creek (Dec. 16, 1932)	.92
Hudson (June 2, 1931)	.65
Lost Soldier (Sept. 30, 1933)	.88
Hamilton Dome, all grades (Feb. 16, 1935)	.57
Torchlight (Sept. 29, 1933)	1.18
Greybull (Sept. 29, 1933)	1.18
Pondera (Sept. 29, 1933)	1.25
Sunburst (Sept. 29, 1933)	1.35
Cat Creek, Montana	1.07
Hogback (Sept. 29, 1933)	1.11
Lea County, N. Mex. (Sept. 29, 1933)	.75
Maljamar (Sept. 29, 1933)	.70
Artesia-Jackson (Dec. 1, 1933)*	.75

Note—Salt Creek, Torchlight, Elk Basin, Grass Creek, Frannie, Greybull, Hogback and Iles by Stanolind Oil & Gas Co. Elk Basin, Grass Creek light, Big Muddy, Rock Creek and Sunburst by Ohio Oil Co. Lost Soldier posted by Producers & Refiners Corp. Artesia, Jackson and Maljamar posted by Continental Oil Co. Lea County, effective September 29, 1933, by Humble Oil & Refining Co. and other buyers; Fort Collins, Wellington, Orchard, Florence, Big Muddy, Cat Creek, Rattlesnake and Table Mesa by Continental Oil Co. Osage posted by Arro. Hamilton Dome, Wyo., by Stanolind Oil & Gas Co. Pondera, Mont., by Ohio Oil Co. (Stanolind Oil & Gas Co., effective January 1, 1935, posted $1 per barrel in Pondera.)

*Continental Oil Co.

North Louisiana and Arkansas

Smackover, Ark. (all grades)	$.70
Tullos, Urania, La. (Jan. 13, 1934)	.87
Nevada, Ark. (Sept. 29, 1933)	.60
East El Dorado (Sept. 29, 1933)	.70
Converse, La. (Mar. 17, 1934)	1.03
Elm Grove, La. (Sept. 29, 1933)	.75
Holly, La. (Nov. 17, 1934)	1.03
Pleasant Hill, La. (Mar. 17, 1934)	1.03
Zwolle, La. (Mar. 17, 1934)	1.03
Champagnolle, Ark. (Mar. 17, 1934)	.81
Lisbon, Ark. (Mar. 17, 1934)	1.03
Stephens, Ark. (Sept. 29, 1933)	.70
Urbana, Ark. (Mar. 17, 1934)	.60
Other fields	(See gravity table)

Note—Smackover: Effective September 29, 1933, Texas Co., Magnolia Petroleum Co., Standard of Louisiana, Louisiana Oil Refining Corp., Gulf Refining Co. and Phillips Petroleum Co. East El Dorado posted by Magnolia Petroleum Co. and Gulf Refining Co., Nevada by Standard Oil Co. of Louisiana. Urbana posted by H. L. Hunt, Inc., and Louisiana Oil Refining Co. Converse, Holly, Zwolle and Urbana by Standard Oil Co. of Louisiana; Elm Grove by Simmons Oil & Refining Co.; Pleasant Hill by Standard Oil Co. and Magnolia Petroleum Co. Champagnolle by Standard Oil Co. and Lion Oil & Refining Co.

Eastern States

TIDE WATER PIPE CO.
(Effective Feb. 4, 1935)

Bradford, Pa.	$2.35
Allegany, N. Y.	2.35

SOUTH PENN OIL CO.
(Effective Feb. 4, 1935)

Pennsylvania Grade Oil in National Transit Lines (Bradford Field)	$2.35
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	2.03
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.97
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.87
Corning Grade Oil in Buckeye Pipe Line Co.'s lines (Oct. 2, 1933)	1.37

PENNZOIL CO.
(Effective Feb. 4, 1935)

Pennsylvania Grade Oil in National Transit Lines:	
Group A (Includes Cochran, Franklin, Hamilton and Doolittle districts.	$2.37
Group B (Includes Titusville district.	2.36
Group C (Includes Turkey and Tidioute districts.	2.35
Group D (Includes Bear Creek and Porkey districts.	2.24
Group E (Includes Eideneau, Bull Creek, Rough Run, Carbon, Dipner, Bredin, McJunkin, Jameson, Kennerdell, Emienton, Tiona, Lacey and Kinzua districts. Price depends on length of pipe line haul to plant at Oil City.	2.21

PURE OIL CO.
(Effective Jan. 4, 1935)

Cabin Creek, W. Va.	$1.82
Bradford Hollow, W. Va.	1.82
Kelly Creek, W. Va.	1.77

CREW-LEVICK CO.
(Effective Jan. 4, 1935)

Oil City-Titusville	2.12

Middle Western States

OHIO OIL CO.

Lima (Feb. 1, 1935)	$1.15
Illinois (Jan. 5, 1934)	1.13
Princeton, Ind. (Jan. 5, 1934)	1.13
Plymouth	Shut in
Western Kentucky (May 26, 1934)	1.03
Midland, Mich. (Sept. 30, 1933)*	1.03
West Branch, Mich.	.86
Oceana, Mich. (Oct. 5, 1933)	.90
Somerset, Ky. (Sept. 30, 1933)	1.39

*Posted by Pure Oil Co. and Simrall Pipe Line Co. Producers Pipe Line Co. pays 5 cents per barrel over Pure Oil Co.'s posted prices. West Branch, Mich., posted by Simrall Pipe Line Co. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and posted price includes premium. Oceana posted by Old Dutch Refining Co. and Naph-Sol Refining Co.

Canada

Ontario (September 9, 1933):	
Petrolia*	$2.19
Oil Springs	2.17
Turner Valley (May 21, 1934):†	
Clear naphtha	$2.55
Discolored naphtha	2.37
Crude oil, 50 gravity	2.19
Crude oil, 45 to 49.9	2.07
Crude oil, 40 to 44.9	1.50

*Imperial Oil, Ltd. †Imperial Oil, Ltd. and Regal Oil & Refining Co.

Mexico

Panuco*	$1.01

*F.o.b. ship, based on January transactions and exclusive of production and export taxes and bar dues.

California Crude Oil Prices

STANDARD OIL CO. OF CALIFORNIA
(Effective September 6, 1933)

For current purchases of crude oil at the well (unless otherwise specified). (All gravities above those quoted take highest price offered in that field.)

Gravity—	Long Beach	Seal Beach, Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda, Brea Canyon	Athens-Rosecrans	Torrance	Richfield	Whittier, La Habra	Montebello	Santa Fe Springs	La Habra-Coyote	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Coalinga	Coyote
14-14.9	$.65	$.65	$.65	$.65	$.65	$.65	....	$.65	$.65	$.65	$.65	....	$.65	$.57	$.57	$.57	$.65
15-15.9	.65	.65	.69	.69	.66	.69	....	.66	.65	.65	.65	....	.65	....	....	....	.65
16-16.9	.66	.65	.72	.73	.69	.73	....	.69	.67	.68	.65	....	.65	....	....	....	.65
17-17.9	.69	.65	.75	.76	.73	.76	....	.72	.70	.71	.65	....	.68	....	....	....	.68
18-18.9	.72	.65	.78	.80	.76	.79	....	.75	.74	.74	.65	....	.71	.61	.61	.59	.71
19-19.9	.75	.65	.81	.83	.80	.82	....	.78	.78	.78	.65	....	.74	.64	.65	.62	.74
20-20.9	.78	.68	.83	.87	.83	.85	....	.81	.82	.81	.66	....	.78	.67	.69	.65	.78
21-21.9	.81	.72	.86	.90	.87	.88	....	.83	.85	.84	.69	$.72	.81	.70	.73	.68	.81
22-22.9	.84	.76	.89	.94	.90	.92	....	.85	.89	.87	.72	.76	.84	.73	.76	.72	.84
23-23.9	.88	.81	.92	.97	.94	.95	$.83	.89	.92	.90	.76	.79	.87	.77	.79	.75	.87
24-24.9	.91	.85	.95	1.01	.97	.98	.86	.92	.97	.93	.80	.83	.90	.81	.82	.78	.90
25-25.9	.94	.89	.98	....	1.00	1.01	.90	.95	1.00	....	.85	.87	.93	.85	.85	.81	.93
26-26.9	.97	.93	1.01	....	1.04	1.04	.94	.98	1.04	....	.89	.90	.96	.89	.88	....	.96
27-27.9	1.00	.98	1.04	....	....	1.07	.97	....	1.08	....	....	.94	.99	.93	.91	....	.99
28-28.9	1.03	1.02	1.07	....	....	1.10	1.01	....	1.11	....	....	.98	1.02	.97	.94	....	1.02
29-29.9	1.06	1.05	1.09	....	....	....	1.04	....	1.15	....	....	1.01	1.05	1.01	.97	....	1.06
30-30.9	1.09	1.10	1.12	....	....	....	1.08	....	....	....	....	1.05	1.09	1.05	1.00	....	1.09
31-31.9	....	....	....	....	....	....	1.12	....	....	....	....	1.08	1.12	1.09	....	....	1.12
32-32.9	....	....	....	....	....	....	1.15	....	....	....	....	1.12	1.15	1.13	....	....	1.15
33-33.9	....	....	....	....	....	....	....	....	....	....	....	1.16	1.18	1.17	....	....	1.18
34-34.9	....	....	....	....	....	....	....	....	....	....	....	1.19	1.21	....	....	....	1.21
35-35.9	....	....	....	....	....	....	....	....	....	....	....	1.23	....	....	....	....	....
36-36.9	....	....	....	....	....	....	....	....	....	....	....	1.26	....	....	....	....	....
37-37.9	....	....	....	....	....	....	....	....	....	....	....	1.30	....	....	....	....	....
38-38.9	....	....	....	....	....	....	....	....	....	....	....	1.34	....	....	....	....	....

Additional Standard Oil Quotations

Mountain View—Effective July 3, 1934, the following are the prices of the Standard Oil Co. of California for its current purchases of crude oil at the well in the Mountain View Field: 14 to 19.9 degrees, 57 cents; 20-20.9, 58 cents; 21-21.9, 59 cents; 22-22.9, 61 cents; 23-23.9, 43 cents; 24-24.9, 66 cents; 25-25.9, 69 cents; 26-26.9, 72 cents; 27-27.9, 75 cents, 28-28.9, 78 cents; 29-29.9, 81 cents; 30-30.9, 84 cents; 31-31.9, 47 cents; 32-32.9, 90 cents; 33 degrees and above, 93 cents.

Elwood Terrace—F.o.b. ship, 33 degrees, $1.03; 34 degrees, $1.06; 35-35.9, $1.09; 36-36.9, $1.12; 37 degrees and over, $1.15.

Newhall—14 degrees and over, 57 cents.

McKittrick and Kern River—14 degrees and over, 57 cents.

Wheeler Ridge—14 to 17.9 degrees, 57 cents; 18-18.9, 58 cents; 19-19.9, 61 cents; 20-20.9, 64 cents; 21-21.9, 67 cents; 22-22.9, 70 cents; 23-23.9, 73 cents; 24-24.9, 76 cents; 25 degrees and over, 79 cents.

Kettleman Hills—33-33.9 degrees, 93 cents; 34-34.9, 96 cents; 35-35.9, 99 cents; 36-36.9, $1.02; 37-37.9, $1.05; 38-38.9, $1.08; 39 degrees and over, $1.11.

The Texas Co. posted in Shiells Canyon, South Mountain and Santa Paula as follows: 14 to 17.9, 57 cents; 3 cents added for each degree up to and including 26-26.9 degrees at 84 cents; then 4 cents added for each degree up to and including 30 degrees and over at $1. Company posts Standard Oil Co.'s Montebello prices in Montebello and North Whittier, and posts Standard Oil Co. prices in Signal Hill, Alamitos Heights, Huntington Beach, Torrance, Richfield and Santa Fe Springs, all effective September 6.

General Petroleum Co. posts Standard Oil Co. prices in Athens, Rosecrans and Signal Hill; Alamitos Heights up to 26-26.9; Santa Fe Springs up to 35-35.9; Richfield up to 25-25.9; Brea Canyon and Olinda up to 25-25.9, and Torrance up to 25-25.9.

Union Oil Co., effective September 6, posts same price as Standard Oil Co. in all fields in which both purchases, excepting that in Athens-Rosecrans, Union Oil Co. posts 21-21.9, 72 cents, and 33--33.9, $1.18; 34-34.9, $1.21, and 35-35.9, $1.24.

Associated Oil Co., effective September 6, posted same prices for the same grades as Standard Oil Co. of California, excepting that in some fields its gravity scale stops as follows: Huntington Beach, 26 degrees and over; Seal Beach and Alamitos Heights, 36 degrees and over; Coyote Hills, 23 degrees and over; Richfield, 25 degrees and over; Torrance, 25 degrees and over; Inglewood, 24 degrees and over; Santa Fe Springs, 35 degrees and over; Midway-Sunset, Elk Hills, Buena Vista Hills, 30 degrees and over. Also Associated pays 52 cents for oil of 11 to 13.9 gravity in McKittrick, Kern Front, Kern River, Midway-Sunset, Elk Hills, Buena Vista Hills and Coalinga.

Southwest Texas Has Active Week With Possible Discovery of Pool in Northern Duval County

SAN ANTONIO, Tex., Apr. 1.—Extending the producing limits of the West Tuleta Field in Bee County, one mile southwest; the apparent discovery of a new field in the extreme northern part of Duval County and the possibilities of production being developed in two wildcat tests in Live Oak County, made the past week one of the most important for the Southwest Texas for several months.

One mile southwest of the nearest production in the West Tuleta Field, Jamison-Bryan and others' No. 1 Campbell in the Brooks and Burleson Survey cored saturated Pettus sand from 3,956-60 feet, the total depth and when tested the latter part of the week, it flowed 114 bbls. of fluid in 14 hours of which 90 per cent was oil and 10 per cent wash water and drilling mud, through a 3-16 inch choke, with tubing pressure 460 pounds and shut in casing pressure 100 pounds.

North and west of production in the West Tuleta Field, another interesting wildcat location has been made by William F. Morgan for his No. 1 Bassinger, located 330 feet from the north and west lines of the east half of the northwest quarter of Section 7 in the Jose Maria Uranga Grant.

May Open New Field

Five miles east of Eagle Hill, in the extreme northern part of Duval County, Harvey and Henderson apparently opened a new field, when their No. 1 Chernoskey, located in Survey No. 226, cored sand from 2,212-24 feet the total depth, and on a 25-minute drill stem test from 2,210-24 feet, recovered 27 thribbles of oil. The operators are preparing to cement casing and it is to be tested the latter part of the week. Although the sand has not been definitely identified, it is the general opinion that it is the upper Government Wells sand.

Three wells in Live Oak County, two of which are wildcats, held the attention of operators in that district. Smith and Story's No. 1 Frederick in the Jane Surry Survey, is reported to have cored saturated sand from 5,201-08 feet, the total depth. Seven-inch casing has been cemented at 5,195 feet, without making a drill stem test, and the plug will be drilled during the week. The test topped the Cockfield sand at 4,950 feet.

One mile northeast of the McNeill Field, Whittington and others' No. 1 Little in the M. M. Shipp Survey cored sand from 5,334-44 feet and is preparing to cement casing without making a drill stem test. The test was originally drilled to 5,314 feet several months ago by Henderson Coquat, and it has recently been taken over by the above operators.

In the McNeil Field, Live Oak County, Lion Oil & Refining Co.'s No. 4 P. E. McNeil, 355 feet due south of the company's No. 1 McNeil, the discovery well, indicated production possibilities when it cored sand from 4,372-81 feet and on a drill stem test from 4,370-81 feet, it began spraying oil over the crown block on a one-quarter inch choke on top and open on the bottom. This is the approximate depth from which the discovery well is producing and is by far the best showing to be made in any of the four wells drilled by the company. One producer and one gas well have been completed in the field. Casing has been cemented, and it is scheduled to be tested during the week. It is reported that one major company is dealing with the company for the purchase of part of its holdings around the well.

If negotiations which are underway are consumated, the county is due to receive several interesting tests within the near future. North of the McNeill Field it is reported that negotiations are under way to drill the T. B. Slick Estate's 6,000-acre block. Other blocks which are due to be tested within the near future are held by Heep Oil Corp. and Adams and Lyles.

Core Oil Sand in Hidalgo County

Considerable attention is being centered on a deep test in Eastern Hildalgo County, drilled by the Union Sulphur Co. on its American Rio Grande Land & Irrigation Co. lease about 8 miles north of the town of Mercedes. This well which is the third deep test to be drilled by the company in this particular district, is reported to have cored 16 feet of oil sand and the operators have cemented 7-inch casing at 7,477 feet, on top of the oil sand. The bottom of the hole was reported to be in sand at 7,493 feet. It is located in Lot 2,082, Block 86 in the North Capisallo District.

The company has been active in this district since 1933 and the above test is the fourth to be drilled below 6,000 feet. It is estimated that the company has about 30,000 acres under lease in the eastern and northeastern part of Hidalgo County, and the extreme western part of Cameron County, which adjoins Hidalgo County on the west. The first test drilled by the company was its No. 1 American-Rio Grande, about 7 miles north of Mercedes in Lot 229, Block 59. It was abandoned at 6,431 feet after the drill stem had stuck. One mile southwest in Block 86 its No. 2 American-Rio Grande was drilled to 8,044 feet, and was one of the deepest holes drilled in the district. It was also abandoned, when the drill stem parted while the operators were reaming. The third test was drilled northeast of Edinburg on the Engelman Gardens and was abandoned at 6,009 feet.

Watching Other Wildcats

Three other wildcat tests, all being in the western part of the county are being watched with considerable interest. Northwest of Mission about 15 miles, D. D. Oil Co.'s No. 1 Brock and Showers in Lot 4, Block 12, Porcion 80, Ancient Jurisdiction of Reynosa is drilling in hard rock below 4,318 feet. Three miles south, Showers and Moncrief's No. 1 Brock and Showers in Lot 11, Block 18, Porcion 79, Ancient Jurisdiction of Reynosa is drilling in rock below 4,183 feet. About two miles southeast of the Sam Fordyce Field, Powell's No. 1 George Moore in the south end of Porcion 42, is drilling in shale below 2,380 feet.

Frank Gravis and others' No. 1 Hahl in the northeast quarter of Survey No. 64, midway between the Government Wells and Loma Novia Field. Duval County, was completed at 2,558 feet and is making approximately 200 bbls. daily on gas lift. One mile south of the above test, in Survey No. 63, L. & R. Oil Co.'s No. 1 Hahl was completed at 2,726 feet for an estimated 20,000,000-foot gas well. North of the Loma Novia Field, Al Buchanan has made location for his No. 1 Ruiz in Survey No. 73. Southeast of the above test, Claude Hamil and others' have made location for their No. 1 Ruiz in Survey No. 41. These are the first locations to be made in the field by independent operators.

Pumper in Bexar County

Two miles northwest of the shallow Cooksey Field, in Bexar County, Campbell's No. 1 Cantu, in the Aricha Grant No. 15, cored the Cooksey sand from 1,467-75 feet and is preparing to pump at a total depth of 1,481 feet. It is estimated that the well will pump around 15 barrels of oil daily, and although it is a small well, it will no doubt cause a number of tests to be drilled in the area. Considerable leasing activity is taking place throughout the Balcones Fault Zone area, the majority of which centers around the shallow productive area near San Antonio. West of San Antonio in Medina County it is reported that a block is being assembled for an Edwards lime test. East of San Antonio, B. L. Raborn is also assembling a block for an Edwards lime test.

Magnolia Petroleum Co.'s No. 6 Seeligson in the Seeligson Field, Jim Well County, located southwest of its No. 3 cored sand from 3,741-46 feet and is now preparing to cement casing after it tested 700 feet of oil on a drill stem test. This apparently opens a new sand for the field, as it is considerable deeper than the other wells, which are producing at around 3,300 feet.

Wildcat Operations in Southwest Texas

Week Ending March 30

ATASCOSA COUNTY

Southwestern Dev. Synd., Ltd.'s No. 1 Tom, 938 ft. from N line, 427 ft. from E line of fence on R.R. right of way, Edward O'Boyle Sur.
Drlg. 700 ft.

BANDERA COUNTY

W. B. Kyle et al's No. 1 Duke, 200 ft. NW line, 150 ft. SW line of J. A. Bennett Sur. No. 7.
Waiting on rig; drlg. wtr. well.

Plateau Oil Co.'s No. 1 Garrison, G.C.&S.F. Sur. No. 506, 1,500 ft. from N and 2,700 ft. from E lines of survey.
Drlg. 2,259 ft.

BASTROP COUNTY

Hiram Edwards' No. 1 Murchison, 11,200 ft. from NW line, 4,200 ft. from SE line, Addison Litton Sur.
Drlg. 895 ft.

Marts & Beavens' No. 1 Miller, 235 ft. from NE line, 414 ft. from SE line of Blk. 22, Dykes Sur.
Drlg. 1,837 ft.

BEE COUNTY

Diamond Half Oil Co.'s (H. H. Weinert) No. 1 McKinney, 2,740 ft. from NW line, 330 ft. from NE line of Spenner Morris Sur.
Abd. 4,200 ft.

Cecil Hagan and Eastland Oil Co.'s No. 1 Fred Schroeder, 5 miles SW of Green.
Drlg. 1,950 ft.

Haines-McMillan Oil Corp.'s No. 1 Stoltzfus, 150 ft. from N and E lines of NE¼ NE¼ NW¼ Sec. 14.
Spudded.

Hartzendorff's No. 1 fee, 990 ft. from N line, 4,290 ft. from W line of 200-ac. tract, George Kerr Sur.
Drlg. 3,500 ft.

Humble O. & R. Co.'s No. 2 Thompson, 466 ft. NW of SE cor. of J. C. Wood tract, Wm. Burke Sur.
Drlg. 6,225 ft.

Jamison, Byron et al's (Dirks) No. 1 P. L. Campbell, Brooks & Burleson Sur.
T.D. 3,960 ft.; I.P. 8 bbls. per hr.; 3/16-in. choke; 460 lbs. tubing pressure.

Philmont Corp.'s No. 1 T. J. Ernest, 466 ft. from SE cor. of J. C. Madray 216-ac., thence 460 ft. NW along survey line, thence S of R/A 466 ft., Bee County School Sur.
Spudded.

Paul L. Meaders' No. 1 Emil Kellar, in NE cor. of Keller tract, Sec. 28, of the M. Alcorte Sur.
Moving in material.

Worth Oil Co.'s No. 1-A Rutledge, 100 ft. S of No. 1, B. Q. Hadley Sur.
Drlg. 3,400 ft.

BEXAR COUNTY

Campbell's No. 1 Cantu, offsetting Meador's No. 1 Cantau, 150 ft. SW line, Arocha Sur. No. 15.
T.D. 1,481 ft.; going on pump.

Jones & Kieffer's No. 1 LaGrane, NW cor. of tract, 210 ft. each way, F. Rolen Sur.
Standing 586 ft.

Geo. O'Neil's No. 1 Holly Crouch, NW cor. of 150-ac. tract.
Preparing to set csg. 1,395 ft.

Carroll C. Raborn's No. 1 Claude McCauley, 150 ft. from N and NW lines of tract in Sec. 52, Wm. Harrison Sur.
Spudded.

CALDWELL COUNTY

Coffield & Lanning's No. 1 Franks, 150 ft. from N and E lines of S½ of 131.6 acres, Edward Brown Sur.
Ready to spud.

DEWITT COUNTY

S. S. Price et al's No. 1 Beuhrig, 330 ft. from N and E lines of Sec. 7, T.&N.O. Sur.
S.D. 2,014 ft.

DUVAL COUNTY

Buffalo-Texas Syndicate's No. 1 Escobas, 2,777 ft. from N line, 1,944 ft. from W line of 930-ac. tract in San Francisco grant.
S.D. 4,010 ft.

Intrepid Oil Co.'s No. 1 Parr, 2,590 ft. from S line, 150 ft. from E line, Sec. 26.
Recmtd. for another test, 4,856 ft.

Henderson & Harvey's No. 1 Chernosky, 330 ft. from S line, 660 ft. from W line, Sur. 226.
Tested 27 thribbles of oil at 2,212-24 ft.

Pearson et al's (Grimes et al) No. 1 Fitzsimmons, 300 ft. from S line, 150 ft. from E line of Sur. 291.
T.D. 4,552 ft.; P.B. to 4,150 ft.; to whipstock and core again.

Texla Oil Co.'s (Johnson Bros.) No. 1 Hubbard, 990 ft. out of SW cor. of Sur. 84.
Drlg. below surface csg.

EDWARDS COUNTY

Harry Adams' No. 1 Holman, 1,650 ft. N line, 330 ft. from E line, Sec. 22, C.C.S. D.&R.G.N.G. Sur.
S.D. 602 ft.

FAYETTE COUNTY

Clark et al's No. 1 Becker, 750 ft. NW line, 1,300 ft. SW line of 143.74-ac. tract in A. E. Baker League.
Location.

Ross Fenton's No. 1 Kasper (263-ac.), 3,000 ft from NE line, 1,280 ft. from SW line, of Thos. Green Sur. No. 28.
Location.

FRIO COUNTY

Amerada Pet. Corp.'s No. 1 Davies, 1,320 ft. from NW line, 330 ft. from NE line of B. L. Crouch Sur.
Spudding.

Amerada Pet. Corp.'s No. 3 Halff & Oppenheimer, 2,100 ft. from southwesterly NW line, 300 ft. NE line of B. J. Gilman Sur. No. 16.
T.D. 3,936 ft.; I.P. 150 bbls. per day.

W. T. Shoemaker's No. 1 M. Roche, 150 ft. SW cor. of Carl Wenzel Sur. No. 139.
S.D. 2,500 ft.

GILLESPIE COUNTY

Ed L. Nixon's No. 3 Lindig, 12,694 ft. S line, 1,333 ft. W line, Maria Josepha Guerra Sur. No. 41.
S.D. in lime 692 ft.

GONZALES COUNTY

Southwestern Dev. Co.'s No. 1 W. S. Atkinson, 2,054 ft. from N line, 1,034 ft. from E line of 185-ac. tract in S. Y. Reams Sur.
Drlg. 2,980 ft.

GUADALUPE COUNTY

C. W. DeFreest's No. 1 Henry Beck, 502 vrs. from NW line, 150 vrs. from N line, Malpaz Sur.
S.D. 510 ft.

A. D. Locke's No. 1 Lowman, 210 ft. from

(Continued on Page 158)

Industry's Electrical Men to Hold Meeting in Dallas

Three busy days are indicated by the program prepared for the annual meeting of the Petroleum Industry Electrical Association, to be held Thursday, Friday and Saturday, April 11, 12 and 13, in the Adolphus Hotel, Dallas, Tex. Preliminary to the convention the annual meeting of the board of directors will be held in the hotel Wednesday evening. The membership of the association is composed of heads of telegraph and telephone departments of oil companies throughout the country.

Thursday will be given over largely to reports, with a roundtable discussion, a blackboard talk by L. E. Adler, an address on safety by J. L. Risinger, and an address on reconditioning pipe lines by E. H. Barrios. Another roundtable discussion will be held Friday, with several technical papers. Officers for the next year will be chosen in the afternoon.

The new officers will be installed Saturday and plans for the future will be discussed. The present officers are: President, Morris Chambers, Standard Pipe Line Co., Shreveport, La.; vice president, J. W. Flint, Empire Companies, Bartlesville, Okla.; secretary-treasurer, H. E. Browne, Sinclair Prairie Pipe Line Co., Independence, Kans. Mr. Browne has held this office since 1928.

Yoakum and Lynn Counties Attracting Attention; Largest Producer Completed in Andrews Area

By L. E. BREDBERG
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Apr. 1.—Announcement by C. J. (Red) Davidson of a test to be drilled in the south central part of Yoakum County featured new work in the West Texas district last week. Throughout the entire area 15 new locations and 22 completions were reported of which 17 were oil wells and 5 dry holes.

Davidson completed a deal with Texas Pacific Coal & Oil Co. whereby he acquired about 5,100 acres out of the company's L. P. Bennett ranch in south central part of Yoakum County and location for a 5,000-foot test was announced at C NE Section 678, Block D, J. H. Gibson Survey. A well here will be interesting from an exploratory and geological standpoint as the completion of this test will afford more definite information on the north end of the Permian Basin since known control points at this time are scattered over a vast area.

During the past two or three years there has been considerable geophysical work throughout Gaines and Yoakum Counties, all of which has been followed by a spirited lease play. If this test should find commercial production it will add thousands of acres of prospective oil territory to the Permian Basin area.

Lynn County

On the northeast edge of the Permian Basin, Wanette Oil Co. and Hart Brothers' No. 1 Edwards, in Section 29, Block 1, L.&S.V. Survey, about 7 miles southwest of Tahoka in Lynn County, had a good showing of gas just above 4,165 feet which threatened a blowout and mud was pumped into the hole. It is now drilling below 4,170 feet in lime.

Glasscock County

John I. Moore and others' No. 1 McDowell, on unit block in north central part of Glasscock County, is drilling below 9,790 feet in lime, no increase in oil or gas being reported. The same company's No. 2 McDowell, in Section 21, and south offset to World's No. 3 McDowell, is drilling at 2,180 feet in lime. It had top of lime at 2,105 feet and set the 7-inch casing at 2,150 feet.

Andrews County

By far the biggest producer completed last week and the best well yet completed in Andrews County was Fuhrman Petroleum Corp.'s No. 2-B Boner, in Section 25, Block A-43, P.S.L. Survey, in the Fuhrman Pool. Total depth is 4,437 feet and it flowed 2,850 bbls. of oil during the last 24 hours of drilling, part of the time choked, and flowed 150 bbls. open the last hour. It had first oil from 4,221-27 feet with increases to total depth. This well offsets two small oil producers and is sure to stimulate activity in the area.

Humble's No. 3 J. S. Means, in Section 9, Block A-35, P.S.L. Survey, Means area of northern Andrews County, is drilling at 4,190 feet in lime after setting the 7-inch casing at 4,100 feet.

Northeast of the Means Pool, York & Harper's No. 1 Hereford Stock Farms, in League 315, Parmer County School Land Survey, is drilling below 4,425 feet in anhydrite.

Crane County

Gulf Production Co. continues drilling in its No. 1 W. N. Waddell and others, Ordovician test in northern Crane County, Section 4, Block B-27, P.S.L. Survey, at 4,020 feet in lime with no further increase in oil or gas encountered. Gulf's semiwildcat in the same part of the county, No. 9 Waddell, Section 11, Block B-23, P.S.L. Survey, is cleaning out on bottom with total depth at 3,518 feet in lime. It swabs about 35 bbls. daily and will make a small producer. This well is about 1¼ miles east of the same company's No. 7 Waddell, a small well.

Wahlenmaier and others' No. 1 Kloh, wildcat in Section 33, Block 44, Township 3s, T.&P. Survey, is drilling below 3,600 feet in lime, no increase in oil or gas. Elevation is 2,796 feet and it topped lime at 3,130 feet. The 7-inch casing was cemented at 3,120 feet. The well was shot from 3,295-3,315 feet and after the shot it bailed 4 bbls. of oil after standing for 14 hours.

Ector County

Possibility of the north end of the Judkins Pool, Ector County, extending very far to the west, was dimmed by Phillips Petroleum Co.'s No. 1 Scharbauer and others, in Section 16, Block B-15, P.S.L. Survey. This test, about a mile west of production, has been abandoned with total depth 4,102 feet after getting increase in water from 4,095-4,102 feet. Although it had approximately 250,000 feet of gas at 3,494-3,502 feet it failed to find oil in drilling to 4,102 feet but had water at 3,985 feet with increases in water at 4,030-38 feet and at 4,095-4,102 feet.

Three wildcat tests in northwest Ector County are drilling ahead. Empire's No. 1 Cummins, in Section 10, Block 45, Township 1n, T.&P. Survey, in the same section and southwest of Davidson's No. 1 Cummins, is drilling at 1,200 feet in red beds with a hole full of water. Landreth Production Co.'s No. 1 Cowden Brothers and Sisters, in Section 18, Block 44, Township 1n, T.&P. Survey, northeast of the same company's No. 1 C. Scharbauer, is drilling salt at 1,500 feet. It topped the anhydrite at 1,420 feet and entered the salt at 1,445 feet. Elevation is 3,192 feet and it is running about 50 feet higher than the No. 1 Scharbauer. Gulf Production Co.'s No. 1 Goldsmith, wildcat in Section 10, Block 44, Township 1s, T.&P. Survey, southeast of the Landreth-Scharbauer well, is drilling anhydrite at 2,830 feet.

Northwest of the Judkins Pool, about 13 miles, Neville G. Penrose and others' No. 1 Kloh, in Section 31, Block 45, Township 1s, T.&P. Survey, is underreaming casing with total depth 3,489 feet. It had an increase in water from 3,486-89 feet.

Stanolind completed one producer in the North Cowden Field and has another in the pay. No. 1 Roberts, Section 20, Block A, P.S.L. Survey, was shot with 200 quarts from 4,250-4,304 feet and flowed 311 bbls. first seven hours. No. 15 J. M. Cowden, Section 24, Block 43, Township 1n, T.&P. Survey, is coring at 4,231 feet in lime.

East of Hendricks

East of the Hendricks Field and just west of the town of Kermit, Siosi Oil Co.'s No. 1 Lovett, in Section 36, Block 26, P.S.L. Survey, is cleaning up a fishing job with total depth 2,424 feet and operators plan to set a string of pipe around 1,200 feet. This well attracted attention last week when it topped the lime considerably higher than other wells in the area and about level with wells in the Hendricks Field.

South of Kermit, in Section 6, Block B-5, P.S.L. Survey, Barnsdall Oil Co.'s No. 1 Brown and Altman are fishing for tools at 2,822 feet. At this depth it is showing about 200,000 feet of gas. This is a north offset to Fox & Butler and others' No. 1 Brown and Altman which was recently completed for around 85 bbls. daily in sandy lime pay from 3,110-3,204 feet.

Drilling continues active in the Sayre Field, northeast of the Hendricks Field. Maxwell-Atlantic's No. 2 Daugherty, Section 11, Block 26, is drilling at 1,600 feet in anhydrite and salt and Texas Pacific Coal & Oil Co.'s No. 2 Daugherty, Section 2, Block 26, is drilling below 1,200 feet in anhydrite.

In this same area, Sayre's No. 2 Daugherty, Section 12, is drilling below 1,500 feet and No. 1 Leck, Section 2, is rigging up rotary with total depth 2,749 feet. The same company's No. 2 J. F. Howe, in Section 12, is preparing to test through tubing at 2,904 feet after getting increase in oil from 2,901-04 feet. Sinclair Prairie's No. 3 Cummins, in Section 11, has resumed drilling below surface pipe set at 750 feet.

Reagan County

Reagan County's wildcat Ordovician test, Skelly and Utah Southern's No. 1-D University, in Section 33, Block 8, south of the Big Lake Field, is drilling at 9,850 feet in brown lime with the formation softening up slightly.

Pecos County

In Pecos County, Gulf Production Co.'s No. 5 White-Baker, about 2 miles west of No. 3, is drilling blue slate at 650 feet. In the same area, International Petroleum Co.'s No. 1 White-Baker, Section 4, Block 207, T.C.R.R. Survey, has been drilled to 1,870 feet without encountering oil, gas or water. It may be abandoned.

NORTH TEXAS

Opening of a new field southwest of Graham in Young County by completion of Rathke Oil Co.'s No. 1 W. H. Wadley, in the A. Coffman Survey, featured North Texas activity last week. The well was completed for around 900 bbls. per day after treating with 3,000 gallons of acid in lime from 4,317-4,415 feet. It is about 2 miles north of South Bend and is about the same distance west of the Bunger Field.

(Continued on Page 155)

Wildcat Operations in West Texas

Week Ended April 1

ANDREWS COUNTY

Fuhrman Pet. Corp.'s No. 2-B Boner, 440 ft. from N and 1,320 ft. from E, Sec. 25, Blk. A-43.
Drlg. 4,437 ft., lime; increase oil 4,406-4,419 ft.; est. 3,500 bbls. oil per day.

Honolulu & Llano Oil Co.'s No. 1-B Parker, 440 ft. from N and 1,650 ft. from E, Sec. 11, Blk. A-43.
Drlg. 290 ft., red rock.

Humble Oil & Ref. Co.'s No. 3 Means, 660 ft. from N and 1,997 ft. from E, Sec. 9, Blk. A135.
T.D. 4,100 ft., lime; running 7-in. csg.; oil sand 4,002-10 ft.; flowing by small heads.

Humble Oil & Ref. Co.'s No. 4 Means, 654 ft. from S and 1,997 ft. from W, Sec. 4, Blk. C-45.
T.D. 1,106 ft., red rock; S.D. for orders.

Stogner et al's No. 1 Richardson, 1,980 ft. N and 660 ft. E. Sec. 4. Blk. A-37, P.S.L. Drlg. 4,105 ft., anhydrite.

J. W. Trippiehorn's No. 1 Ogden, 330 ft. from S and 2,310 ft. from W lines of Sec. 6, Blk. A-46, P.S.L. Sur.
Cellar and pits.

Wahlenmaier et al's No. 1 Odessa Ranch Co., 1,320 ft. from N and E of Sec. 10, Blk. A-32, P.S.L. Sur.
T.D. 395 ft., red rock; jarring on tools.

Wahlenmairer et al's No. 1 Cox Estate, 1,320 ft. from N and W of Sec. 8, Blk. A-33. Location.

York & Harper's No. 1 Hereford Stock Farms, C Labour 12, League 315, Parmer Co. School Lands.
Drlg. 4,240 ft., anhydrite and red rock.

BREWSTER COUNTY

F. C. Dodson's No. 1 Texas American Syndicate, 660 ft. from N and E, Sec. 66, Blk. 10, G.H.&S.A. Sur.
Drlg. 406 ft., red rock.

Joiner et al's No. 1 McIntyre, 353 ft. from S, 2,290 ft. from E of Sec. 21, Blk. 352, W. M. Mitchell Sur.
T.D. 2,150 ft., lava; S.D. for orders.

King & Franklin's No. 1 Gage Est., C Sec. 138, Blk. 22, G.H.&S.A. Sur.
T.D. 800 ft., lime; S.D. for orders.

G. H. Storey's No. 1 Wilson, 1,980 ft. from N and E lines of Sec. 3, Blk. 212, T.&St.L. Sur.
Rigging up Star machine.

S. G. Smith's No. 1 Decie, 2,490 ft. from S and E, Sec. 7, Blk. 1.
T.D. 805 ft., lime; mudding 6⅝-in. csg.; slight show of oil and gas 795-805 ft.; 600 ft. water in hole.

COCHRAN COUNTY

Kelsey's No. 1 Slaughter, C Labour 36, League 150, R.C.S. Lands.
Derrick.

West Texas Development Co.'s No. 1 Slaughter, near C of Labour 53, League 149, Randall Co. School Lands.
Derrick

COKE COUNTY

Haggerty et al's No. 1 Gaston, 340 ft. from S and 654 ft. from W, Sec. 11, Jos. Young Sur. (old well deepening).
T.D. 2,808 ft., lime; underreaming 6-in. csg. 1,200 ft.; water from 2,785-2,795 ft.

CRANE COUNTY

Cranfill Bros.' No. 1 Tubbs, 330 ft. from S and W of Sec. 11, Blk. B-27, P.S.L. Sur.
Ready to spud.

Gulf Prod. Co.'s No. 1 M. B. McKnight, 660 ft. from S and W, Sec. 9, Blk. B-21.
Rig completed; moving in tools.

Gulf Prod. Co.'s No. 1 Waddell, C NW NW Sec. 4, Blk. B-27, P.S.L. Sur.
Drlg. 3,750 ft., gray lime.

Gulf Prod. Co.'s No. 9 Waddell, C of NE. Sec. 11, Blk. B-23, P.S.L. Sur.
T.D. 3,518 ft., lime; cleaning out; shot 360 qts. from 3,244-3,496 ft.; flowed 20 bbls. oil in 24 hrs.

Wahlenmaier Pet. Corp.'s No. 1 Kloh, 330 ft. from S and 1,609 ft. from W, Sec. 33, Blk. 44, Twp. 3s, T.&P. Sur.
Drlg. 3,589 ft., lime.

CROCKETT COUNTY

Eppenauer Drlg. Co.'s No. 1-C Powell, 1,600 ft. from S and 250 ft. from E, Sec. 53, Blk. B.B.
Elev. 2,665 ft.; T.D. 2,267 ft.; cleaning out.

Leslie-Hiller et al's No. 1 Todd, 1,200 ft. N and 330 ft. E. Sec. 26, Blk. WX, G.C.&S.F. Sur.
S.D. 580 ft. for casing.

Humble Oil & Ref. Co.'s No. 1 Couch, C NW Sec. 3, Blk. QR, G.C.&S.F. Sur.
Temporarily abnd. 1,881 ft.; elev. 2,538 ft.

CULBERSON COUNTY

Anderson-Pritchard Oil Corp., Magnolia Pet. Co. et al's No. 1 Borders, 1,355 ft. N and 2,305 ft. from W. Sec. 34, Blk. 69, P.S.L. Sur.
Drlg. 1,125 ft. on iron.

Miller Bros.' No. 1 fee, 1,900 ft. from N and 660 ft. from E line of Sec. 21, Blk. 97, P.S.L. Sur.
T.D. 2,107 ft., sand; ran 6-in. csg. and S.D. for orders.

Wood et al's No. 1 Hall, 350 ft. from S and 85 ft. from E. Sec. 11, Blk. 54½, 16 miles N of Van Horn, P.S.L. Sur.
S.D. 246 ft.

DAWSON COUNTY

Adams & Turner's No. 1 John Robinson, 1,320 ft. from N line, 1,320 ft. from W line of Sec. 46, Blk. M, E.L.&R.R. Sur.
Drlg. 4,700 ft., lime.

ECTOR COUNTY

Atlantic Oil Prod. Co.'s No. 1 T. P. Land Trust, 440 ft. from N and W of SE Sec. 11, Blk. 43, Twp. 1s, T.&P. Sur.
T.D. 4,391 ft.; plugged back to 4,265 ft.; swabbing to test.

Barnsdall Oil Corp.'s No. 2 Smith, 330 ft. from S and W lines of Sec. 1, Blk. 43, Twp. 1s, T.&P. Sur.
Rigging up.

(Continued on Page 156)

Seventy-Seven Locations and 102 Completions All Producers But Three, in East Texas Area

By L. E. BREDBERG

DALLAS, Tex., Apr. 1.—There were 77 locations in the East Texas Field the past week, and 102 completions, all producers but three, two junked and abandoned and one in the northeast corner of Cherokee County in W. Dykes Survey was salt water and abandoned, three were completed as pumpers, one completed on gas lift, one was heading and four completed as "swabbers."

Total production to March 21 for Cayuga Field, in northwest Anderson County, since discovery was 852,088.43 bbls. Total production for Long Lake Field, in southwest Anderson County, since discovery to March 21 was 61,317.49 bbls.

It is reported J. B. Daniels has made a deal with Shell Petroleum Corp. to drill a well on its Red Lake Block, Freestone County, and location is reported to be 1,900 feet northeast of Daniels' No. 1 Ball, which was completed as a gas well.

There were three wildcat tests abandoned during the week. The test, drilled by E. M. Thomason on the Addis Estate, J. T. Johnson Sur., Cherokee County, was junked and abandoned at 5,136 feet. The test drilled by Humble Oil & Refining Co. on the Holderman farm, C. Sullivan Survey, Hill County, was dry at 3,398 feet. The test drilled by I. & G. Oil Co. on the Rambin farm, J. Simpson Survey, Nacogdoches County, was dry at 4,007 feet, shale and sandy shale.

The wildcat test of W. C. McGlothlin, being drilled on the M. A. Dobbin farm in E. Lowry Sur., 2 miles north of Corsicana, Navarro County, made a drill stem test from 2,070-2,102 feet and tested 520 feet mud and fresh water in 12 minutes. It is now coring below 2,107 feet in sand and shale with no show.

Cayuga Completion

Joe A. Worsham's No. 1 W. F. Wathen, in B. Towels Sur., 1¾ miles north of Cayuga Field, Anderson County, oil sand 4,060-68 feet, total depth 4,091 feet. Latest reports state the well is flowing from 20 to 25 bbls. oil per hour through one-half inch choke with 250 pounds tubing pressure and 500 pounds casing pressure. This wildcat well extends the Cayuga Field approximately 1¾ miles north. Before the well was tested it was reported royalty in the immediate vicinity of the well was selling for $175 per acre base.

It is reported J. W. Barton has assembled a block of approximately 4,700 acres 1 mile east of Blossom, Lamar County, and has until June to start a test.

Mr. Parks is reported to have made a trade to drill four shallow wells on the L. & G. Oil Co.'s block northeast of Nacogdoches, Nacogdoches County, to test the shallow showing encountered in the L. & G. Oil Co.'s No. 1 Rambin, around 90 feet.

The Trinity sand test of Tide Water and Texas Seaboard Oil Companies, No. 21-A Wills, S. Edmondson Survey, Cayuga Field, northwest Anderson County, is drilling below 6,400 feet.

It is reported Mr. O'Byrne of Corsicana is assembling a 3,400-acre block in the L. H. Thomason, T. Cayce, A. P. McWilliams, G. Reeves, and W. R. Flower and surrounding surveys, south and east of Martin's Mill, 10 miles southeast of Canton. A tentative location has been made on the J. D. Daniel 115-acre tract, located in W. R. Flowers Survey.

From March 17 to 28, inclusive, Gulf Production Co.'s No. 1 Davey & Royall, gas well in Camp Hill area, Anderson County, produced 1,931.73 bbls., or an average of 160 bbls. per day, making an average of 2.5 per cent basic sediment and water.

Gulf Production Co.'s No. 1 Maddox, in the David Stitz Survey, Camp Hill area, Anderson County, was drilling at 3,215 feet in hard shale and lime shells. Gulf Production Co.'s No. 1 Robinson, in D. Stitz Survey, was drilling at 629 feet in sandy shale with no show. Gulf's No. 1 L. B. Ross, in J. C. Rosson Survey, logged top of Austin chalk at 4,936 feet and is drilling at 5,008 feet in chalk. Gulf's No. 1 M. J. Ross, in R. Erwin Survey, is drilling at 5,213 feet in hard lime and brown sand and is going to test from 5,192 to 5,213 feet.

Gregg County Completions

Amada Oil Co.'s No. 8 Magrill, top sand 3,657 feet, total depth 3,698 feet, initial production 60 bbls. per hour. Arkansas Fuel Oil Co.'s No. 4-A Bolton, top sand 3,492-3,502 feet, total depth 3,513 feet in shale, initial production 30 bbls. per hour; No. 5-A S. G. Smith, top sand 3,504 feet, total depth 3,529 feet, initial production 27 bbls. in 15 minutes. Atlantic's No. 13 Wilson, top sand 3,580 feet, total depth 3,633 feet, initial production 110 bbls. per hour. Canadian Production Co.'s No. 5 Whittaker, top sand 3,500 feet, total depth 3,564 feet, initial production 135 bbls. per hour. L. C. Collins and others' No. 5 Fisher, top sand 3,417 feet, total depth 3,431 feet, initial production 67 bbls. per hour. Cox & Hammond's No. 11 E. Lacy, top sand 3,483-3,531 feet, total depth 3,552 feet in shale, initial production 87 bbls. in 30 minutes. Dillard Oil Co.'s No. 4 Jones, top sand 3,621 feet, total depth 3,650 feet, initial production 81 bbls. in 30 minutes. Gulf Production's No. 67 Judge, top sand 3,490 feet, total depth 3,511 feet, initial production 60 bbls. per hour; No. 12 Lacy-Snyder, top sand 3,466 feet, total depth 3,497 feet, initial production 70 bbls. per hour.

Magnolia Petroleum Co.'s No. 5 M. Dyer, top sand 3,532 feet, total depth 3,559 feet, initial production 212 bbls. per hour; No. 27 L. J. Everett, top sand 3,682 feet, total depth 3,692 feet, initial production 100 bbls. per hour through 2-inch choke; No. 16 R. B. White, top sand 3,500 feet, total depth 3,530 feet, initial production 135 bbls. per hour through 2-inch choke. Selby Oil & Gas Co.'s No. 18-A Snavely heirs, top sand 3,604 feet, total depth 3,606 feet, initial production 24 bbls. in 30 minutes. Shasta Oil Co.'s No. 6-B Richey, top sand 3,556 feet, total depth 3,570 feet, initial production 100 bbls. per hour. Sinclair Prairie Oil Co.'s No. 13-BA J. W. Aiken, top sand 3,567 feet, total depth 3,610 feet, initial production 35 bbls. in 15 minutes; No. 47 Moncrief, top sand 3,550 feet, total depth 3,610 feet, initial production 40 bbls. in 15 minutes; No. 48 Moncrief, top sand 3,575 feet, total depth 3,635 feet, initial production 35 bbls. in 15 minutes.

Yount Lee Oil Co.'s No. 7 Custer, top sand 3,544-50 feet, total depth 3,557 feet in shale, initial production 27 bbls. per hour through eleven-sixteenths inch choke; No. 15 Stuckey-Thrasher, top sand 3,566 feet, total depth 3,586 feet, initial production 60 bbls. per hour. Bay Oil Co.'s No. 4 W. Smith, top sand 3,533 feet, total depth 3,558 feet, initial production 98 bbls. per hour. Empire Gas & Fuel Co.'s No. 7 Lockhart, top sand 3,642 feet, total depth 3,646 feet, initial production 23 bbls. in 15 minutes; No. 10 Lockhart, top sand 3,501 feet, total depth 3,560 feet, initial production 37 bbls. in 30 minutes. Fair & Thompson's No. 5-B Carr, top sand 3,485 feet, total depth 3,515 feet, initial production 62 bbls. per hour. Gulf Production Co.'s No. 75 S. Hilburn, top sand 3,567 feet, total depth 3,591 feet, initial production 75 bbls. per hour; No. 23 A. Muckelroy, top sand 3,583 feet, total depth 3,597 feet, initial production 84 bbls. per hour. Kemp & Pierson's No. 1-C Young, top sand 3,551 feet, total depth 3,598 feet in shale, initial production 30 bbls. per hour.

Roger Lacy's No. 5 Adkins, top sand 3,654 feet, total depth 3,665 feet, junked and abandoned, crooked hole. Al Plummer's No. 6 Beall, top sand 3,659 feet, total depth 3,660 feet, initial production 50 bbls. per hour. Shell Petroleum Corp.'s No. 9-B Bivens, top sand 3,651 feet, total depth 3,662 feet, initial production 65 bbls. per hour; No. 45 Watson, top sand 3,526 feet, total depth 3,611 feet, initial production 21 bbls. in 15 minutes; No. 50 J. B. Watson, top sand 3,585 feet, total depth 3,650 feet, initial production 26 bbls. in 30 minutes.

Sinclair Prairie Oil Co.'s No. 18 Andrews, top sand 3,434-48 feet, total depth 3,455 feet in shale, initial production 21 bbls. in 15 minutes; No. 19 Andrews, top sand 3,445-87 feet, total depth 3,490 feet in shale, initial production 90 bbls. per hour; No. 20 Andrews, top sand 3,445-52 feet, total depth 3,470 feet in shale, initial production 100 bbls. per hour; No. 21 Andrews, top sand 3,440-54 feet, total depth 3,470 feet in shale, initial production 25 bbls. in 25 minutes; No. 47-B King Trustee No. 1, top sand 3,466-80 feet, total depth 3,510 feet, initial production 30 bbls. in 15 minutes; No. 48-B King, top sand 3,460 feet, total depth 3,490 feet, initial production 25 bbls. in 15 minutes; No. 49-B King, top sand 3,459-79 feet, total depth 3,485 feet, initial production 60 bbls. per hour; No. 50-B King, top sand 3,445-58 feet, total depth 3,485 feet, initial production 60 bbls. per hour; No. 51-B King, top sand 3,453-68 feet, total depth 3,490 feet, initial production 90 bbls. per hour; No. 54-B King, top sand 3,469-80 feet, total depth 3,485 feet, initial production 25 bbls. in 15 minutes; No. 19 Lockhart, top sand 3,656 feet, total depth 3,697 feet, initial production 40 bbls. per hour.

Stanolind-Noble's No. 9 Beall, top sand 3,658 feet, total depth 3,659 feet, initial production 60 bbls. per hour. Stanolind Oil & Gas Co.'s No. 2 N. Radford, top sand 3,574 feet, total depth 3,591 feet, initial production 90 bbls. per hour. Sun Oil Co.'s No. 18 C. H. Hilburn, top sand 3,680 feet, total depth 3,682 feet, initial production 44 bbls. per hour.

Rusk County

Atlantic's No. 16 Brightwell, top sand 3,602 feet, total depth 3,632 feet, initial production 100 bbls. per hour. Devonian-Gulf's No. 35 Motley, top sand 3,726 feet, total depth 3,739 feet, initial production 70 bbls. per hour. Geier Brothers' No. 3 Minor heirs, top sand 3,715 feet, total depth 3,716 feet, initial production 80 bbls. per hour. Griffith Oil Co.'s No. 2 S. Brox, top sand 3,602 feet, total depth 3,710 feet in shale, initial production 25 bbls. in 30 minutes. Gulf Production's No. 5 H. Baton, top sand 3,550-3,618 feet, total depth 3,638 feet in shale, swabbing 10 bbls. per hour.

Humble Oil & Refining Co.'s No. 70-B S. S. Laird, top sand 3,498 feet, total depth 3,570 feet, initial production 21 bbls. per hour on gas lift; No. 9-C H. Sexton, top sand 3,716 feet, total depth 3,736 feet, initial production 34 bbls. in 30 minutes. McAlester Fuel Co.'s No. 1 Roy Laird, top sand 3,625 feet, total depth 3,650 feet in shale, initial produc-

East Central Texas Wildcats

Week Ending March 30

ANDERSON COUNTY—CAMP HILL AREA

Gulf Prod.'s No. 1 M. Maddox, David Stitz Sur., 330 ft. out og SE cor. of 120-ac. tract and survey.
Began Mar. 24; 10-in. 582 ft.; drlg. sand 2,120 ft.

ANDERSON COUNTY

Gulf Prod. Co.'s No. 3 Davey & Royall, 50 ft. S of No. 1, M. Rogers Sur.
T.D. 485 ft.; comp. Mar. 18, 1935; 500,000 ft. gas and little oil; shut-in pressure 80 pounds.

Gulf Prod. Co.'s No. 1 Delaney, in P. Martin Sur., 340 ft. N along E line of Delaney 209.37-ac. tract from SW cor. of Ross' 39.67 acres, and 300 ft. at R/A.
Derrick.

Gulf Prod. Co.'s No. 1 Calloway, P. Martin Sur., 305 ft. from S and 330 ft. from E. Location.

Gulf Prod. Co.'s No. 1 L. B. Ross, J. C. Rosson Sur., 330 ft. S and E of 35-ac. tract.
Pecan Gap chalk 3,976-4,256 ft.; drlg. 4,456 ft.; shale.

Gulf Prod. Co.'s No. 1 W. B. Robinson, David Stiltz Sur., 330 ft. out SE cor. of 1,000-ac. tract.
Began Mar. 25; 10-in. 41 ft.; cored 541 ft. of green sand; top green sand 534 ft.; no show, oil or gas.

Gulf Prod. Co.'s No. 1 Flint & Scott, 385 ft. S along E line from NE cor. of 56.75-ac. tract and 330 ft. at R/A.
Location.

Gulf Prod. Co.'s No. 1 O. G. Rogers, 330 ft. out of NW cor. of D. Parker Sur., 5 miles SW of Elkhart.
Pecan Gap chalk 4,095-4,280 ft.; drlg. shale and lime 4,420 ft.

Gulf Prod. Co.'s No. 1 M. J. Ross, 1,770 ft. from SW and 1,370 ft. from NW lines of Robt. Erwin Sur.
T.D. 5,179 ft.; sand with slight stain and odor; D.S. test 5,127-42 ft.; made 650 ft. S.W. and 20 ft. mud in 5 minutes.

J. W. Lutter' No. 1 C. McKee, 2,640 ft. from N line of lease and survey and 330 ft. from W line of McKey 840-ac. tract.
Derrick.

Tide Water-Seaboard's No. 1 J. Smith, John Adams Sur., 668 ft. W of E line and 467 ft. N of S line of 41-ac. tract (Long Lake area).
Rigging up.

Tide Water Oil Co. et al's No. 21-A Wells, 4,079 ft. N and 2,333 ft. W of lease, S. Edmondson Sur. (Trinity test).
Drlg. 6,400 ft.

Worsham's No. 1 Wathen, 1,400 ft. S and 467 ft. from E line of B. Towles Sur., NW of Cayuga.
Austin chalk 3,220-3,585 ft.; T.D. 4,091 ft.; sand and sady shale; D.S. test 4,062-91 ft.; made 300 ft. oil, 30 ft. sand and mud and small amount of gas in 3¼ minutes; reported well making small amount of oil; 7-in. 4,060 ft.

BOWIE COUNTY

Tex-Ark. Oil Co.'s No. 1 Hamilton Estate, 600 ft. E and 350 ft. N lines, J. Milan Sur., 4 miles S of Red River.
T.D. 250 ft.; W.O.C.

CHEROKEE COUNTY

Jacksonville O. & G. Co.'s No. 1 H. D. Henderson, 660 ft. from N and W lines of 40-ac. tract out of Tankersley 104-ac. tract, 5 miles NE of Jacksonville, J. Pineda Sur.
S.D. 693 ft.

Ponta Oil Co.'s No. 1 C. W. Darby, 1,944 ft. S and 630 ft. W of East Cyrus Parks Sur., 2¾ miles S of Summerfield.
T.D. 1,385 ft.; corrected; D.S. stuck.

E. M. Thomason et al's No. 1 Addis Estate, 250 ft. S of survey and 150 ft. E of railroad, J. T. Jones Sur., 6 miles NW Alto Elev. 471 ft.; top Austin 4,897 ft.; cored 5,127-35 ft.; T.D. 5,136 ft.; junked and abd.

Wilson Stubbs Oil Co.'s No. 1 Rowborts, 450 ft. from S line, 150 ft. from W line of 100-ac. tract, 2 miles SW of Jacksonville. J. D. Wolfin Sur.
S.D. 1,553 ft.

T. J. Woods et al's No. 3 New Birmingham Dev. Co., 1,320 ft. from S and 150 ft. from E lines of 160-ac. tract, L. Jordan Sur., NE of No. 1.
Material.

(Continued on Page 158)

tion 100 bbls. per hour. Magnolia Petroleum Co.'s No. 11 Nat Bean, top sand 3,523-35 feet, total depth 3,595 feet, initial production 30 bbls. per hour by heads. Navarro Oil Co.'s No. 15 Brightwell, top sand 3,596 feet, total depth 3,635 feet, initial production 60 bbls. per hour. Rozell Oil Co.'s No. 4 J. Williams, top sand 3,590 feet, total depth 3,663 feet, junked and abandoned. J. T. Smith's No. 3 Morse, top sand 3,568 feet, total depth 3,618 feet, initial production 30 bbls. in 30 minutes through three-quarters inch choke.

Stan-Tex' No. 6 L. Morris, top sand 3,590 feet, total depth 3,625 feet, initial production 100 bbls. per hour. Texas Co.'s No. 6 Chappell, top sand 3,702 feet, total depth 3,705 feet, initial production 100 bbls. per hour. Acme Oil Co.'s No. 4 M. L. Thompson, top sand 3,681 feet, total depth 3,735 feet, initial production 40 bbls. in 15 minutes. Amerada and others' No. 19 Stovall, top sand 3,632 feet, total depth 3,662 feet, initial production 16 bbls. in 15 minutes. Atlantic's No. 14-A Pinkston, top sand 3,645 feet, total depth 3,665 feet, initial production 90 bbls. per hour; No. 11-D Pinkston, top sand 3,580 feet, total depth 3,640 feet in shale, initial production 80 bbls. per hour; No. 12-D Pinkston, top sand 3,557-3,604 feet, total depth 3,625 feet in shale, initial production 60 bbls. per hour. R. B. Bryant's No. 4 R. Redwine, top sand 3,538 feet, total depth 3,565 feet, pumping 20 bbls. in five hours. J. E. Powers' (formerly O. R. Cooper) No. 1 E. E. Moores, top sand 3,650 feet, total depth 3,670 feet, initial production 25 bbls. in 30 minutes.

O. Currin's No. 1 W. H. Frederick, top sand 3,581 feet, total depth 3,622 feet in shale, swabbing 20 bbls. per hour. R. E. Fair, Inc.'s No. 16 Maxwell, top sand 3,628 feet, total depth 3,703 feet, initial production 15 bbls. in 15 minutes. M. E. Florence and others' No. 1 B. Perry, top sand 3,608 feet, total depth 3,625 feet, initial production 139 bbls. in two hours. G. B. R. Oil Co.'s No. 13 L. Harmon, top sand 3,765 feet, total depth 3,822 feet, initial production 75 bbls. per hour. Gulf Production's No. 8 A. H. Rayford, top sand 3,740 feet, total depth 3,746 feet, initial production 69 bbls. per hour through three-quarters inch choke. Humble Oil & Refining Co.'s No. 13 W. B. Kee, top sand 3,749 feet, total depth 3,764 feet, initial production 33 bbls. in 25 minutes; No. 3 M. Neal, top sand 3,670-84 feet, total depth 3,737 feet in shale, initial production 26 bbls. per hour.

Hunt Production Co.'s No. 12-C C. D. Ashby, top sand 3,520 feet, total depth 3,598 feet, swabbing 20 bbls. per hour. Southern Oil Production's (formerly Jenkins Corp.) No. 3 J. B. Henson, top sand 3,525 feet, total depth 3,600 feet in shale, initial production 20 bbls. per hour through 2-inch tubing. Sinclair Prairie's No. 18 Wilson, top sand 3,632 feet, total depth 3,643 feet, initial production 42 bbls. in 15 minutes. Slaughter-Chalk's No. 4 Frederick, top sand 3,553 feet, total depth 3,600 feet, pumping 30 bbls. in six hours. Slaughter-Kugler's No. 2-B J. P. Maxwell, top sand 3,565 feet, total depth 3,603 feet in shale, swabbing 27 bbls. per hour. Thomason Holding's No. 5 Thompson, top sand 3,730 feet, total depth 3,736 feet, initial production 30 bbls. in 30 minutes. Tide Water's No. 3-B Hale, top sand 3,580 feet, total depth 3,630 feet in shale, initial production 10 bbls. in 10 minutes through 1-inch choke. Wooley Petroleum Co.'s No. 7 M. McMillan, top sand 3,702 feet, total depth 3,719 feet, initial production 30 bbls. in 15 minutes.

Smith County

Cockburn & Boaze's No. 12 Green, top sand 3,803 feet, total depth 3,805 feet, initial production 60 bbls. per hour. Johnson-Owen's No. 9 Jackson, top sand 3,753 feet, total depth 3,755 feet, initial production 85 bbls. per hour. M. H. McMurray's No. 12 G. A. Turner, top sand 3,758 feet, total depth 3,759 feet, initial production 60 bbls. per hour. Sells Petroleum Co.'s No. 4 St. Clair, top sand 3,754 feet, total depth 3,761 feet, pumping 20 bbls. per hour, 30 per cent salt water. Sinclair Prairie Oil Co.'s No. 31-A Mayfield, top sand 3,748 feet, total depth 3,753 feet, initial production 35 bbls. in 15 minutes; No. 35-A Mayfield, top sand 3,798 feet, total depth 3,803 feet, initial production 30 bbls. in 15 minutes; No. 37-A Mayfield, top sand 3,814 feet, total depth 3,817 feet, initial production 38 bbls. in 15 minutes; No. 38-A Mayfield, top sand 3,814 feet, total depth 3,819 feet, initial production 48 bbls. in 15 minutes. No. 40-A Mayfield, top sand 3,839 feet, total depth 3,842 feet, initial production 30 bbls. in 15 minutes. Sun Oil Co.'s No. 11 J. A. Layne, top sand 3,641 feet, total depth 3,645 feet, initial production 60 bbls. per hour. Thomason Holding's No. 2 S. S. Cook, top sand 3,805 feet, total depth 3,806 feet, initial production 20 bbls. in 20 minutes. Weaver-Perry's No. 9 Wright, top sand 3,690 feet, total depth 3,692 feet, initial production 100 bbls. per hour.

Upshur County

Atlantic's No. 16 Porter, top sand 3,655 feet, total depth 3,672 feet, initial production 100 bbls. per hour. Gulf Production's No. 13 W. A. Ray, top sand 3,605 feet, total depth 3,618 feet, initial production 60 bbls. per hour. Sabinas Corp.'s No. 5-B J. W. Falvey, top sand 3,697 feet, total depth 3,705 feet, initial production 100 bbls. per hour. Simms & Buttram's No. 16 Flewellen, top sand 3,628 feet, total depth 3,634 feet, initial production 60 bbls. per hour. Stanolind and Falcon's No. 3-C C. V. Everett, top sand 3,559 feet, total depth 3,582 feet, initial production 24 bbls. in 15 minutes. A. H. Tarver and others' No. 3 J. W. Free, top sand 3,657 feet, total depth 3,680 feet, initial production 45 bbls. in 30 minutes through 1-inch choke. Urban Oil Co.'s No. 11 Phillips, top sand 3,618 feet, total depth 3,654 feet, initial production 32 bbls. in 20 minutes.

Cherokee County

Eagle Drilling Co.'s No. 1 Lee Lacy, top sand 3,648-54 feet, total depth 3,654 feet, dry and abandoned, salt water, tested oil and salt water at 3,654 feet, plugged back to 3,650 feet and swabbed mud and salt water.

West Texas Fields

(Continued from Page 153)

Another interesting completion in Young County was Pitzer & West and Simms Oil Co.'s No. 1 Irene Gathwright, about 2 miles north of the James Pool. It had saturated lime from 3,825-70 feet which was treated with acid. It came in flowing at the rate of 100 bbls. daily. This well is in Section 607, T.E.&L. Survey and opens a new producing area.

WEST TEXAS COMPLETIONS

Andrews County

Humble Oil & Refining Co.'s No. 3 R. M. Means, total depth 4,628 feet in lime, top pay 4,547 feet, treated with 3,000 gallons of acid, initial production 145 bbls. of oil per day flowing through tubing.

Crane County

Gulf Production Co.'s No. 5-A Crier-McElroy, total depth 2,890 feet in gray lime, top pay 2,690 feet, shot with 300 quarts from 2,690-2,875 feet, initial production 1,446 bbls. of oil per day flowing through casing with 1,904,000 feet of gas per day.

Ector County

Amerada Petroleum Corp.'s No. 1 O. B. Holt, total depth 4,322 feet in lime, plugged back to 4,306 feet, topped pay at 4,215 feet, main pay at 4,270 feet, shot with 230 quarts from 4,213-4,322 feet, initial production 218 bbls. of oil per day, pumping. George Farley's No. 1 Connell, total depth 3,668 feet in lime, top pay 3,476 feet, shot with 400 quarts from 3,482-3,668 feet, initial production 230 bbls. of oil per day, flowing through tubing. Landreth Production Co.'s No. 1 C. Scharbauer, total depth 4,236 feet in lime, plugged back to 4,186 feet, top pay 4,116 feet, treated with 2,000 gallons of acid solution, initial production 40 bbls. of oil and 1 bbl. of water per day; No. 6-T University, total depth 3,635 feet in lime, top pay 3,509 feet, shot with 300 quarts from 3,485-3,605 feet, initial production 234 bbls. of oil per day, flowing through casing. Phillips Petroleum Co.'s No. 1 John Scharbauer, total depth 4,102 feet in sand, dry and abandoned. Shell Petroleum Corp.'s No. 4 Jones, total depth 3,718 feet in lime, top pay 3,631 feet, shot with 180 quarts from 3,634-3,712 feet, initial production 469 bbls. of oil per day, flowing through casing. Stanolind Oil & Gas Co.'s No. 5 E. F. Cowden, total depth 4,447 feet in lime, plugged and abandoned.

Fisher County

General Crude Oil Co.'s No. 5 J. A. Young, total depth 3,124 feet, top pay 3,121 feet, treated with 1,000 gallons of acid, initial production 70 bbls. of oil plus 65 per cent water in 24 hours' pumping. Merry Brothers & Perini and others' No. 1 Howard, total depth 3,679 feet, plugged back to 3,675 feet, top pay 3,670 feet, initial production 148 bbls. of oil and 191 bbls. of water in 24 hours' pumping.

Howard County

Sinclair Prairie Oil Co.'s No. 14 Dodge estate, total depth 2,810 feet, top pay 2,465 feet, shot with 300 quarts from 2,685-2,810 feet, initial production 138 bbls. in 24 hours' pumping.

McCulloch County

Cardinal Oil Co.'s No. 4 White Brothers, total depth 680 feet in lime, dry and abandoned. E. L. Coggin's No. 1 Craven estate, total depth 740 feet in lime, dry and abandoned. George Poulter and others' No. 1 J. R. Hull, total depth 779 feet in lime, top pay 635 feet, initial production 6,000,000 feet of gas daily.

Pecos County

Cardinal Oil Co.'s No. 31-E Tippett, total depth 528 feet in sand, top pay 525 feet, initial production 40 bbls. per day, pumping.

Sterling County

Merry Brothers & Perini and others' No. 1 Stansbury, total depth 3,142 feet in lime, dry and abandoned.

Ward County

California Co.'s No. 28 Durgin, total depth 2,548 feet in lime and sand, top pay 2,278 feet, initial production 248 bbls. of oil per day, flowing through tubing; No. 29 Durgin, total depth 2,612 feet in lime, top pay 2,340 feet, top main pay 2,553 feet, shot with 400 quarts from 2,412-2,612 feet, initial production 503 bbls. per day, flowing through casing. Jerry Sines and others' No. 1 William Alley, total depth 2,692 feet in lime and sand, dry and abandoned.

Winkler County

J. C. Maxwell's No. 1 Oscar Clapp, total depth 3,487 feet in lime, plugged back to 3,210 feet, plugged and abandoned.

WICHITA FALLS COMPLETIONS

Archer County

L. T. Burns and others' No. 2 R. Churchwell, total depth 1,164 feet, top pay 1,159 feet, initial production 106 bbls. of oil, 25 per cent water. F. P. Cullum's No. 31 Falls, total depth 1,156 feet, top pay 1,137 feet, initial production estimated 150 bbls. per day pumping. Cullum and Alexander's No. 28 Falls, total depth 1,210 feet, top pay 1,193 feet, initial production 70 bbls. of oil per day. Fain & McGaha Oil Corp.'s No. 39 Mrs. C. S. Arnold, total depth 1,221½ feet, top pay 1,203 feet, initial production 200 bbls. of oil per day; No. 40 Mrs. C. S. Arnold, total depth 1,129 feet, top pay 1,211 feet, initial production 250 bbls. of oil per day swabbing; No. 24-C W. Ferguson, total depth 1,776 feet, dry and abandoned. W. L. Hawkins and others' No. 2 B. C. Andrews, total depth 871 feet, top pay 864 feet, initial production 20 bbls. of oil per day. Hooker and Blackerby's No. 1 W. H. Terrell, total depth 664 feet, top pay 660 feet, initial production 7 bbls. of oil per day. S. H. Huggins and others' No. 1 Walter Ford, total depth 1,200 feet, dry and abandoned. G. A. Milroy and others' No. 4 H. O. Prideaux, total depth 648 feet, top pay 635 feet, initial production 15 bbls. of oil per day. C. R. Obermeyer and others' No. 1 Neal Wilburn, total depth 1,200 feet, dry and abandoned. George L. Pace's No. 24 C. L. Abercrombie, total depth 1,194½ feet, top pay 1,179 feet, initial production 60 bbls. of oil per day.

Perkins and Cullum's No. 154 Falls, total depth 1,204 feet, top pay 1,188 feet, initial production 120 bbls. of oil per day; No. 6 Falls, total depth 1,204 feet, top pay 1,190 feet, initial production 40 bbls. of oil per day. Petroleum Producers' No. 1 Frank Brezina and others, total depth 1,439 feet, top pay 1,432 feet, initial production 75 bbls. of oil per day. United Producers' No. 1 J. R. Jones and others, total depth 925 feet, dry and abandoned. Underwood and others' No. 2-B Ward, total depth 1,058 feet, dry and abandoned. White and Duncan's No. 4 S. Webb, total depth 698½ feet, top pay 692 feet, initial production 7 bbls. of oil per day.

Baylor County

Consolidated & Petroleum Producers' No. 1-D W. H. Portwood, total depth 1,383 feet, top pay 1,380 feet, initial production 250 bbls. of oil per day.

Clay County

Walter Gant's No. 2 Worsham estate, total depth 5,127 feet, dry and abandoned.

Cooke County

Bridwell Oil Co.'s No. 1 R. W. Trew, total depth 1,484½ feet, top pay 1,475 feet, initial production 200 bbls. of oil per day.

Jack County

Brazos River Gas Co.'s No. 4-B Mrs. P. B. Keyser, total depth 2,968 feet, top pay 2,844 feet, initial production 5,000,000 feet of gas per day. Buttram Petroleum Co.'s No. 12 J. A. Jones estate, total depth 2,053 feet, top pay 2,049 feet, initial production 60 bbls. of oil per day. Dobbs Oil Co.'s No. 1 S. S. Campsey, total depth 807 feet, dry and abandoned. E. S. Van Patton and others' No. 1 L. Richardson, total depth 460 feet, dry and abandoned.

Montague County

Howard and Redman's No. 1 J. W. Stewart, total depth 1,274 feet, dry and abandoned. Lesh and McCall's No. 4 C. L. Davenport and others, total depth 1,677½ feet, top pay 1,663 feet, initial production 250 bbls. of oil per day.

Throckmorton County

Dickie Brothers' No. 1 J. C. Irvin, total depth 820 feet, dry and abandoned.

Wichita County

Centennial Oil Co.'s No. 1 State of Texas, total depth 523 feet, dry and abandoned. Continental Oil Co.'s No. 4 L. P. Douglas (old well deepened, old total depth 1,562 feet), total depth 1,934½ feet, top pay 1,926 feet, initial production 210 bbls. of oil in 24 hours. Golding and Cochran's No. 14-C J. and J. Waggoner, total depth 1,547 feet, dry and abandoned; No. 15-C Waggoner Brothers, total depth 1,397 feet, top pay 1,374 feet, initial production 35 bbls. of oil per day. Humble Oil & Refining Co.'s No. 28 Wichita-Taylor, total depth 844 feet, top pay 833 feet, initial production 11 bbls. of oil and 27 bbls. of water per day. Petroleum Producers' No. 70 Allen and Kemp, total depth 1,469 feet, top pay 1,466 feet, initial production 8 bbls. of oil per day. George Proctor's No. 18 W. B. Honaker, total depth 1,525 feet, dry and abandoned. Texas Co.'s No. 19 Allen and Kemp, total depth 465 feet, dry and abandoned.

Wilbarger County

A. G. Reed's No. 1 Waggoner estate, total depth 1,683 feet, top pay 1,680 feet, initial production 8 bbls. of oil per day.

Young County

James B. Baker, Jr.'s No. 7 O. S. Perkins, total depth 781 feet, dry and abandoned. Charles Barnes and others' No. 1 Alice Hazelton, total depth 481

feet, dry and abandoned. L. T. Burns' No. 1 S. J. Furr, total depth 800 feet, dry and abandoned. Cato Brothers' No. 5 G. B. Hamilton estate, total depth 892 feet, top pay 869 feet, initial production 60 bbls. of oil per day. R. W. Clampitt and others' No. 1 W. Farmer, total depth 745 feet, top pay 741 feet, initial production 15 bbls. of oil per day. B. C. Gilmore and others' No. 1 Prideaux Brothers, total depth 517 feet, top pay 507 feet, initial production 15 bbls. of oil per day. Petroleum Producers' No. 12 J. C. Graham, total depth 693 feet, top pay 679 feet, initial production 24 bbls. of oil per day. Rathke Oil Co.'s No. 8 C. E. Graham, total depth 959 feet, dry and abandoned. Wooten and Reed's No. 3 J. A. Watson, total depth 610 feet, dry and abandoned. Christie Brothers' No. 3 Jeffery estate, total depth 3,978 feet, dry and abandoned. Lindsey Drilling Co. and others' No. 2 Marshall Morgan estate, total depth 4,933 feet, dry and abandoned. McLester Oil Co.'s No. 1 Rickles-Vick, total depth 3,815 feet, dry and abandoned.

PANHANDLE COMPLETIONS

Carson County

Dixon Creek Oil & Refining Co.'s No. 1-D McConnell, total depth 2,700 feet, top pay 2,410 feet, initial production 39,300,000 feet of gas per day. Gulf Production Co.'s No. 7 Cooper, total depth 3,023 feet, top pay 2,945 feet, shot with 400 quarts from 2,920-3,023 feet, initial production 357 bbls. per day, pumping.

Gray County

Dixon Creek Oil & Refining Co. and E. B. Hopkins' No. 3 Benedict, total depth 3,287 feet, top pay 3,228 feet, shot with 300 quarts from 3,208-87 feet, initial production 408 bbls. per day, pumping; No. 1 McConnell "G," total depth 2,705 feet, top pay 2,424 feet, initial production 35,100,000 feet of gas per day. Dyke Oil Co.'s No. 2 McConnell, total depth 3,291 feet, top pay 3,245 feet, initial production 597 bbls. per day, pumping; No. 3 Noel, total depth 3,280 feet, top pay 3,150 feet, initial production 339 bbls. per day, pumping. Shell Petroleum Corp.'s No. 1 T. D. Haggard, total depth 3,249 feet, top pay 3,185 feet, shot with 120 quarts from 4,200-49 feet, initial production 161 bbls. per day, pumping. Stanolind Oil & Gas Co.'s No. 6 Cobb "C," total depth 3,325 feet, top pay 3,259 feet, shot with 200 quarts from 3,244-3,323 feet, initial production 255 bbls. per day, pumping. Sun Oil Co.'s No. 7 Combs-Worley, total depth 2,944 feet, top pay 2,844 feet, initial production 1,253 bbls. of oil with 5,000,000 feet of gas per day, flowing. Wilcox Oil & Gas Co.'s No. 34 Combs-Worley, total depth 2,898 feet, top pay 2,820 feet; bridged back to 2,835 feet and treated with 1,000 gallons of acid. Initial production 118 bbls. per day, pumping. Acid treatment did not increase production.

Hutchinson County

Stanolind Oil & Gas Co.'s No. 8-B Ware, total depth 3,121 feet, top pay 3,000 feet, shot with 340 quarts from 2,985-3,121 feet, initial production 112 bbls. per day, pumping.

Wheeler County

Champlin Refining Co.'s No. 2 Tom Edes, total depth 2,552 feet, top pay 2,245 feet, initial production 2,008 bbls. per day, flowing. Miller and Huselby's No. 1 fee, total depth 2,543 feet, top pay 2,475 feet, initial production 1,812 bbls. per day, flowing. Phillips Petroleum Co.'s No. 6 Lela, total depth 2,527 feet, top pay 2,490 feet, initial production 1,487 bbls. of oil with 29,000,000 feet of gas per day. Smith Brothers' No. 1 Johnson, total depth 2,510 feet, top pay 2,110 feet, topped best pay at 2,504 feet, initial production 1,615 bbls. per day, flowing; No. 1 Massey, total depth 2,125 feet, top pay 1,981 feet, initial production 48,000,000 feet of gas per day. Texas Co.'s No. 8 Keller, total depth 2,526 feet, top pay 2,380 feet, initial production 3,672 bbls. of oil with 17,000,000 feet of gas per day, flowing.

West Texas Wildcats

(Continued from Page 153)

W. A. Black & Sons' No. 3 Connell, 330 ft. from S and 1,310 ft. from W lines of Sec. 1, Blk. B-16, P.S.L. Sur.
Drlg. 605 ft., red rock.

Callahan et al's No. 1 Connell, 330 ft. from N and 990 ft. from W, Sec. 10, Blk. 30, Twp. 1s.
Drlg. 3,230 ft., lime.

Empire Gas & Fuel Co.'s No. 1 Cummins, 440 ft. from S and E, Sec. 10, Blk. 45, Twp. 1n. T.&P. Sur.
Drlg. 1,185 ft., red rock.

Gulf Prod. Co.'s No. 1 Goldsmith, C of NW, Sec. 10, Blk. 44, Twp. 1s, T.&P. Sur.
Drlg. 2,625 ft., anhydrite.

International Pet. Corp.'s No. 1 Cowden, 660 ft. from S and E, Sec. 26, Blk. 44, Twp. 2s, T.&P. Sur.
T.D. 3,585 ft., gray shale; cleaning out at 3,580 ft.

Landreth Prod. Co.'s No. 1-B O. B. Holt, 660 ft. from N and 1,980 ft. from E lines of Sec. 19, Blk. "A," P.S.L. Sur.
Bldg. derrick.

Landreth Prod. Co.'s No. 1 Cowden Heirs, 440 ft. from S and W, Sec. 18, Blk. 44, Twp. 1n. T.&P. Sur.
Drlg. 1,435 ft., anhydrite.

Penrose et al's No. 1 Kloh & Rumsey, 2,310 ft. from S and E, Sec. 31, Blk. 45, Twp. 1s, T.&P. Sur.
Elev. 3,154 ft.; T.D. 3,520 ft., red sand; underreaming 6⅝-in. csg.; increase water 3,486-89 ft.

C. L. Peters' No. 1 Connell, 330 ft. from N and E lines of NW of Sec. 12, Blk. B-16, P.S.L. Sur.
Location.

EL PASO COUNTY

Tri-State Oil Co.'s No. 1 Kinkel, 190 ft. from N and 550 ft. from E, Sec. 237, A.T.&S.F. Sur.
Drlg. 75 ft., shale.

FISHER COUNTY

George Callihan et al's No. 1 Herring, 2,310 ft. from S and 330 ft. from W lines of Sec. 192, Blk. 1, B.B.B.&C. Sur.
Bldg. derrick.

GARZA COUNTY

N. L. Richards' No. 1 Sullivan, 330 ft. from N and W, Sec. 3, Blk. 5, K. Aycock Sur.
Drlg. 570 ft., shale.

GLASSCOCK COUNTY

Capitan O. Co.'s No. 1 Gilliam, 2,310 ft. from S and 1,960 ft. from E, Sec. 21, Blk. 35, Twp. 2s, T.&P. Sur.
Elev. 2,610 ft.; T.D. 2,291 ft.; T.P. 2,288 ft.; pumped 125 bbls. oil and 125 bbls. water in 13 hrs.; S.D. for orders.

Luce & Pickens' No. 2 Turner, 1,650 ft. from N and 2,310 ft. from E lines of Sec. 19, Blk. 33, Twp. 2s, T.&P. Sur.
Drlg. 105 ft.

John I. Moore et al's No. 1 McDowell, 2,310 ft. from S and 2,397 ft. from E, Sec. 31, Blk. 34, Twp. 2s, T.&P. Sur.
T.D. 2,150 ft.; running 6-in. csg.

John I. Moore et al's No. 1 J. S. McDowell, 1,980 ft. from N line and 660 ft. from E line of Sec. 22, Blk. 34, Twp. 2s, T.&P. Sur.
Topped lime 9,471 ft.; show oil and gas 9,484-9,520 ft.; cmtd. 7⅝-in. csg. at 9,470 ft.; drlg. 9,730 ft., lime and shale; increase oil 9,594-9,600 ft. and 9,633-55 ft.

HOWARD COUNTY

Dorn et al's No. 1 Kloh, 330 ft. from S and E, Sec. 45, Blk. 30, Twp. 1n. T.&P. Sur.
Elev. 2,287 ft.; T.P. 2,585 ft.; T.D. 2,791 ft., lime; running 6-in. csg.; flows 50 bbls. oil per day.

C. Henson et al's No. 1 B. Scott, 330 ft. from N and 1,650 ft. from E, Sec. 93, Blk. 29, T.&P. Sur.
S.D. 1,254 ft.

Iron Mountain Oil Co.'s No. 6 Reed, 330 ft. from S and W lines of Sec. 46, Blk. 30, Twp. 1n, T.&P. Sur.
Cellar.

Siegel's No. 1 Foster, 990 ft. from S and 330 ft. from W, Sec. 43, Blk. 29.
Drlg. 768 ft., sand.

IRION COUNTY

Lowe, Delaney et al's No. 5 Nutt, 490 ft. from N and E of SW¼ Sur. 6, Gonzales County School Lands.
T.D. 1,468 ft.; T.P. 1,465 ft.; flowing by heads; testing.

JEFF DAVIS COUNTY

C. M. Joiner's No. 1 Jones & Coffield, 770 ft. from N and 1,322 ft. from E, Sec. 8, Blk. 3, H.&T.C. Sur.
Drlg. 320 ft., lava.

JONES COUNTY

Campbell et al's No. 1 Rowell, in E hair of W half, Sec. 6, T.&P. Sur.
T.D. 950 ft.; shut down.

Campbell et al's No. 1 Enevill, 1,400 ft. from N and 270 ft. from W, Sec. 2, M.E.&P. Sur., ½ mile S of Anson.
T.D. 2,185 ft., shale; underreaming 6-in. csg.

Cal-Tex Oil Co.'s No. 1 Smith, 1,400 ft. from S and 2,000 ft. from E, Sec. 25, Blk. 19, T.&P. Sur.
T.D. 2,125 ft.; fishing for tools.

Fondran Prod. Co.'s No. 1 S. R. Cox Jr., 200 ft. from S and 3,700 ft. from E, Sec. 74, Blk. 14, T.&P. Sur.
Drlg. 1,623 ft., lime.

Dr. C. E. Johnson's No. 1 Young, 1,800 ft. from N and 750 ft. from W of SE 200 acres of B. Travenio Sur.
T.D. 1,836 ft.; cleaning out.

Owen et al's No. 1 Johnson & Dunwoody, 3,750 ft. from S and 330 ft. from W, Sec. 6, Blk. 17, T.&P. Sur.
Spudded and S.D.

Richards et al's No. 1 Ransom, 200 ft. from N and E, Sec. 244, B. M. Clopton Sur.
S.D. 750 ft.

ANNOUNCING

A

REMOVABLE DRILL STEM FLOAT VALVE

for use when drilling in under pressure with tubing, or for use in a drill stem along with a wire line core barrel, as an addition to our line of

OTIS REMOVABLE BOTTOM HOLE CHOKES

* * *

THE SOUTHERN STATES COMPANY, INC.

Tower Petroleum Building . . . . . Dallas, Texas

Midland, Texas Oklahoma City, Okla. Houston, Texas

Robb & Brewer's No. 1 Evans, 200 ft. from S and E lines of N half of Sec. 7, Blk. 15, T.&P. Sur.
Derrick.
T. O. Shappell's No. 1 Steele, 330 ft. from N and 2,000 ft. from E lines of Sec. 10, Blk. 15, T.&P. Sur.
Drlg. 690 ft., shale.
T. O. Shappell's No. 1 Stevenson, 150 ft. from N and 2,411 ft. from W, Sec. 7, Blk. 16, T.&P. Sur., 7 mi. SW of Hawley.
Drlg. 1,690 ft., lime.
T. K. Simmons' No. 1 T. M. Harrell, 200 ft. from S and 1,050 ft. from E of Sec. 7, Orphan Asylum Lands.
Drlg. 2,065 ft.
Ungren & Frazier et al's No. 1 Steele, 1,450 ft. from S and 200 ft. from W lines of Sec. 8, Blk. 10, C. Allen Sur.
T.D. 1,205 ft.; fishing for tools.
United Producers No. 1 T. P. Wood, 1,000 ft. from N and 450 ft. from W lines of farm, B. Traverino Sur. No. 196.
Drlg. 1,250 ft., lime.

LOVING COUNTY

D. C. Evans' No. 1 W. D. Johnson, 2,310 ft. from N and 1,650 ft. from W, Sec. 13, Blk. 57, Twp. 1, T.&P. Sur.
T.D. 2,033 ft., anhydrite; rigging up.
Mason Oil Co.'s No. 1 Kyle, 1,980 ft. from S and E, Sec. 22, Blk. 55, Twp. 1, T.&P. Sur.
T.D. 495 ft., quicksand; jarring on tools.

LYNN COUNTY

Hart Oil Co.'s No. 1 Edwards, 220 ft. from N and 200 ft. from W of SE Sec. 29, L.&S.V. Sur.
Elev. 3,112 ft.; drlg. 4,089 ft., lime.

MARTIN COUNTY

Wright & Scott's No. 1 Flannigan, 330 ft. N and E, Sec. 22, Blk. 37, Twp. 1s, T.&P. Sur.
S.D. 100 ft.

MITCHELL COUNTY

Sawtell & Grueber's No. 1 Morrison
S.D. 1,020 ft.

McCULLOCH COUNTY

Brock & Seward's No. 1 McCall, 2,250 ft. from S and 2,139 ft. from E lines of Sec. 2, John Ware Sur.
Drlg. 348 ft., shale; hole full salt water 250-62 ft.
Cardinal Oil Co.'s No. 5 White Bros., 2,024 ft. from N and 984 ft. from E lines of Sec. 2, Wm. Dewey Sur.
Spudded.
Honea et al's No. 1 Cox, 450 ft. from S and 150 ft. from E, David Pope Sur.
S.D. 846 ft., black shale.
Miller et al's No. 1 Black, 160 ft. from N and 175 ft. from E, Sur. 290, H.&T.C. Sur., 3 miles E of Placid.
S.D. 445 ft.
Skaggs & Brewer's No. 1 Dunn, 190 ft. from S and 570 ft. from E, Sec. 951, T. L. Kartig Sur.
T.D. 700 ft.; bailing hole after setting 5-in. csg.

PECOS COUNTY

Cardinal Oil Co.'s No. 1 White & Baker, 2,310 ft. from S and 330 ft. from W, Sec. 51, Blk. Z, T.C. Sur.
Drlg. 2,027 ft., lime; increase oil and gas 1,857 ft.; increase gas 2,001 ft.
Gulf Prod. Co.'s No. 5 White & Baker, 330 ft. from N and E lines of Sec. 88, Blk. 194, G.C.&S.F. Sur.
Drlg. 290 ft., lime.
International Pet. Co.'s No. 1 White & Baker, 2,310 ft. from S and 330 ft. from E, Sec. 4, Blk. 207, T.C. Ry. Sur.
Drlg. 1,375 ft., anhydrite.
Messenger's No. 1 Dr. Sibley, 4,980 ft. from S and 990 ft. from W, Sec. 6, Blk. 9, H.&G.N. Sur.
Location.
Trans-Tex. Oil Co.'s No. 1 Caldwell, 330 ft. from E line and 330 ft. from S line of Sec. 37, Blk. 40, Twp. 9, T.&P. Sur.
S.D. 1,680 ft. for csg.

REAGAN COUNTY

Byrd-Frost Inc.'s No. 1 Boyd, 1,320 ft. from S and E of Sec. 6, Blk. E, L.V.S.&V. Sur.
Drlg. 1,238 ft., red rock.
Dobbs' No. 1 Friend, 2,310 ft. from S and 660 ft. from W of Blk. 3, Wm. Allen Sur., 3 or 4 miles S of Big Lake.
Drlg. 1,955 ft., sand; hole full water 1,910-55 ft.
Skelly Oil Co.'s No. 1-D H. S. Grayson, 1,980 ft. from N line and 660 ft. from W line of Sec. 33, Blk. 8, University Land Sur.
Drlg. 9,840 ft., brown lime; no show oil, gas or water.

REEVES COUNTY

J. E. Cunningham's No. 1 Altman, 2,310 ft. from N line and 1,980 ft. from E line of Sec. 1, C. C. Wyatt Sur.
T.D. 3,738 ft.; recmtd. 5¼-in. csg. 3,738 ft.; drlg. cmt. plug.
Herbert Oil Co.'s No. 1 Williams & Walker, 5,280 ft. from S and 1,320 ft. from E, Sec. 17, Blk. 6, H.&G.N. Sur.
Spudded and S.D.
K. Slack et al's No. 1 Reeves, 1,980 ft. from N and W, Sec. 20, Blk. 56, P.S.L. Sur.
Moving in material.

RUNNELS COUNTY

Dennis et al's No. 1 Wash, 550 ft. from N and 560 ft. from E of W half, Sec. 123, E.T.R.R. Sur.
Spudded and S.D.
Melrose Oil Co.'s No. 1 L. P. Woods, 150 ft. from NE lines and 3,475 ft. from W line of survey, Willett Holmes Sur. No 100.
S.D. 2,507 ft.
R. Wells' No. 1 James, 396 ft. from N and 330 ft. from E of James tract in Sec. 16, D. Diaz Sur.
S.D. 1,100 ft.

SCHLEICHER COUNTY

John M. Cooper et al's No. 1 Bert Page, 1,290 ft. from N line, 1,470 ft. from W line of Sec. 40, Blk. L, G.H.&S.A. Sur.
Drlg. 6,005 ft., sandy lime.

W. C. Proctor et al's No. 1 Judkins & Spencer, 1,320 ft. from S and W of W. W Russell grant.
Moved off tools.

SCURRY COUNTY

Coffield & Guthrie's No. 1 Holliday, 2,310 ft. from N and 330 ft. from W, Sec. 120, Blk. 97, H.&T.C. Sur.
T.D. 2,697 ft.; plugged back to 2,075 ft.; shut down.
McLaughlin's No. 1 Allen, 1,321 ft. from N and 1,338 ft. from E, Sec. 298, Blk. 97.
T.D. 610 ft., red shale; hole caving.

STONEWALL COUNTY

Merry Bros. and Perrini et al's No. 1 Williams, C SW of SW Sec. 6, Blk. C, A.B &M. Sur.
S.D. 3,000 ft.

SUTTON COUNTY

Texas et al's No. 1 Mower, 1,980 ft. from S and W of Sec. 39, Blk. 5, T.W.&N.G. Sur.
S.D. 4,527 ft., shale and lime; cmtd. cave 4,520-27 ft.

TAYLOR COUNTY

Eastland Oil Co.'s No. 1 Tittle, 660 ft. from N and W, Sec. 37, Blk. 19, T.&P. Sur., 1 mile NE of Trent.
Machine

TERRELL COUNTY

W. A. Sudderth's No. 1 Phelps, 2,157 ft. from N line and 2,482 ft. from the W line of Sec. 5, Blk. 4-A, G. W. Turley Sur.
S.D. 5,635 ft.

TOM GREEN COUNTY

J. F. Jacobs et al's No. 1 De Long, 1,320 ft. from N and 2,640 ft. from E, George Smith Sur. No. 1,325 ft.
Drlg. 280 ft., lime.

UPTON COUNTY

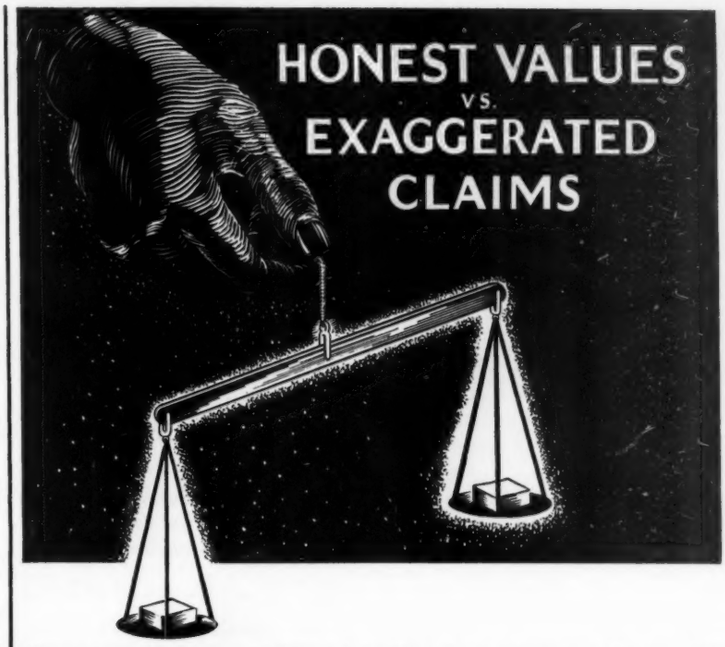
Baldridge Oil Co.'s No. 1 S. Peck, 440 ft from S and E, Sec. 29, Blk. 41, Twp. 4s T.&P. Sur.
Drlg. 1,075 ft., red rock.
Gulf Prod. Co.'s No. 103 McElroy, 1,980 ft from S and 660 ft. from W, Sec. 197, Blk F. C.C.S.D.&R.G.N.G. Sur.
Drlg. 12,127 ft., lime and shale; showing no oil or gas.
Humble Oil & Ref. Co.'s No. 1 Pollock, C of NW, Sec. 4, Blk. M.
Elev. 2,758 ft.; drlg. 3,682 ft., anhydrite.
King Mountain Pet. Co.'s No. 1 Sherk, 33 ft. from S and W, Sec. 29, Blk. 1, M.E.&T Sur.
S.D. 1,908 ft., red rock, for sand line.
Williams & Williams Drlg. Co.'s No. 1 Robbins, 1,600 ft. from S and 1,900 ft. from E, Sec. 4, G.C.&S.F. Sur.
Drlg. on iron at 2,040 ft.

WARD COUNTY

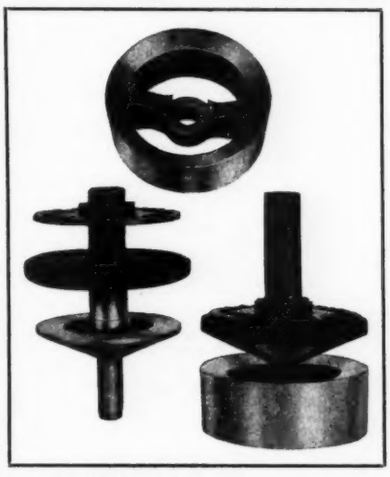
Alexander's No. 1 Richter, 1,650 ft. from NW, 1,170 ft. from NE line of Sec. 27 Blk. 34, H.&T.C. Sur.
Drlg. 1,980 ft., anhydrite and shale.
Bradford et al's No. 1 E. R. Allen, 660 ft. from NW line and 551 ft. from NE line Sec. 11, Blk. 5, H.&T.C. Sur.
T.D. 1,520 ft., anhydrite; shut down.
Caprito's No. 1 Hardage & Wilson, 2,310 ft from NE and 990 ft. from SE, Sec. 11 Blk. 34, H.&T.C. Sur.
Material.
Cook Drlg. Co.'s No. 1 Wood, 330 ft. from NW and SW, Sec. 5, W. F Stewart Sur.
T.D. 2,548 ft.; plugged back to 2,527 ft.; S.D. for orders.
Eastland Oil Co.'s No. 1 Richter, 2,310 ft. from NW and 330 ft. from SW of Sec. 23, Blk. 34, H.&T.C. Sur.
T.D. 2,623 ft., lime; plugged back to 2,582 ft.; testing water shut-off; water 2,600-23 ft.
Gulf Prod. Co.'s No. 55 O'Brien, 1,650 ft. N and 330 ft. from E. Sec. 18, Blk. F.
Drlg. 2,345 ft., anhydrite.
Gulf Prod. Co.'s No. 56 O'Brien, 2,310 ft. from N and 330 ft. from E, Sec. 18, Blk F.
Drlg. 1,775 ft., salt.
Magnolia Pet. Co.'s No. 2 Sealy Estate, 2,310 ft. from S and 330 ft. from W, Sec. 43, Blk. F.
T.D. 1,242 ft.; set 13-in. csg. at 1,236 ft.; waiting on cement.
Postelllo & Caprito's No. 1 Purcell, 330 ft from NE and 990 ft. from NW, Sec. 17 Blk. 34, H.&T.C. Sur.
T.D. 2,775 ft., lime; preparing to plug.
Rector Oil Co.'s No. 1 Monroe, 660 ft. from SE and NE. Sec. 2, Blk. 1, W.&N.W. Sur.
Drlg. 2,093 ft., sandy lime; hole full water.
Sageland Oil Corp.'s No. 2 Pure-Bennett 1,650 ft. from NW and 2,310 ft. from SW S.D. 220 ft.
Jerry Sines' No. 1 Brown, 330 ft. from NW and NE. Sec. 13, Blk. 5, H.&T.C. Sur.
Drlg. 2,025 ft., shale and lime.
West Texas O. & R. Co.'s No. 1-C University, 330 ft. from N and E. Sec. 6, Blk. 14
T.D. 1,578 ft., sand; underreaming csg. and cleaning out.

WINKLER COUNTY

Barnsdall Oil Co.'s No. 1 Brown & Aultman, 2,310 ft. from N and W, Sec. 6, Blk. 5, P.S.L. Sur.
T.D. 2,802 ft., lime; running 6⅝-in. csg.; est. 200,000 ft. gas 2,550-71 ft.
Green Prod. Co.'s No. 1 J. F. Cross, 330 ft. from N and 2,310 ft. from W, Sec. 4, Blk. B-10, P.S.L. Sur.
Material.
Harry Adams' No. 2 Scarborough, 990 ft. from N line and 990 ft. from W line, Sec 2, Blk. 77, P.S.L. Sur.
Location.
Humble Oil & Ref. Co.'s No. 2-A Walton, 660 ft. from S and W, Sec. 48, Blk. 26, Derrick.
Magnolia Pet. Co.'s No. 6 Watton, 330 ft. from S and 1,650 ft. from W, Sec. 1, Blk. 26, P.S.L. Sur.
T.D. 2,960 ft., lime; running tubing.
Maxwell & Atlantic's No. 2 Daugherty, 990 ft. from S and 330 ft. from E, Sec. 11, Blk. 26, P.S.L. Sur.
Drlg. 1,465 ft., anhydrite and salt.
Mid-Continent Pet. Corp.'s No. 2 Howe, 1,650 ft. from N and 330 ft. from W, Sec. 12, Blk. 24.



Exaggerated claims and free trial offers do not increase the wearing qualities of Pump Valves. MacClatchie Valves are sold on their superior design, quality of material and reasonable price. Their value is established. They are time-tried, tested and proven. United States patents grant us the exclusive privilege of properly designing a valve to give the best general service.



Tests by engineering departments of many of the major oil companies show that without exception for general use under varying conditions and for month in and month out service MacClatchie Valves show a remarkable saving over all other makes. We were the first to offer the trade stream line valves with reversible inserts—valves with cross bar striking surface—valves and seats made of forged steel. MacClatchie Pump Valves have never been successfully imitated. In order to better serve you we have recently induced many additional supply companies to stock and sell MacClatchie Pump Valves. There are more MacClatchie pump valves used than any other make. Quality is responsible.

HYDRO-SEAL PLUG VALVES DON'T CUT OUT—HOLD THE PRESSURE AND TURN UNDER ALL WORKING CONDITIONS

MacClatchie "Hydro-Seal" Valves offer the greatest improvement in plug valves since their conception. This valve employs no packing thereby eliminating friction caused by packing glands and packing. It will last longer because it shows leakage around the stem when the plug is not seated correctly or if metal sealing lips are not properly expanded by grease pressure. "Hydro-Seal" Plug Valves are made in sizes from ½ inch to 20 inches in screw, flange and union ends and in working pressures from 250 pounds to 2,000 pounds. Write for new Plug Valve Catalog.

MacCLATCHIE MANUFACTURING CO.
COMPTON CALIFORNIA
(Plug Valves, Pistons and Mud Valves Sold by All Leading Supply Houses)

SECOND

NATIONAL

BANK

Capital and Surplus

$2,250,000.00

In the Heart of Downtown

Houston

Second National Bank Building

Main at Rusk

Houston, Texas

T.D. 2,989 ft.; T.P. 2,800 ft.; flowing 20 bbls. oil per day; may acidize.

Richardson's No. 1 Walton, 1,010 ft. from S and 330 ft. from W. Sec. 1, Blk. B-3.
T.D. 2,426 ft., anhydrite and shale; set 8-in. csg. at 2,426 ft.; waiting on cement.

Sayre Oil Co.'s No. 2 Lum Daugherty, 990 ft. from S and 330 ft. from E lines of Sec. 2, Blk. 26, P.S.L. Sur.
Drlg. 1,145 ft., anhydrite.

Sayre Oil Co.'s No. 1 Lock, 330 ft. from S and E. Sec. 2, Blk. 26, P.S.L. Sur.
T.D. 2,737 ft., sand; S.D. for orders.

Sayre Oil Co.'s No. 2 Howe, 330 ft. from N and W. Sec. 12, Blk. 26, P.S.L. Sur.
T.D. 2,965 ft., lime; running 2½-in. tubing to test; oil 2,790-92 ft. and 2,901-04 ft.; flowed 100 bbls. in 12 hrs.

Shelly Oil Co.'s No. 2 Halley, 1,320 ft. from N and 2,200 ft. from E, Sec. 25, Blk. B-11, P.S.L. Sur.
S.D. 3,090 ft.

Sinclair Oil Co.'s No. 1 Lowett, 330 ft. from N and E. Sec. 36, Blk. 26, P.S.L. Sur.
Drlg. 2,400 ft., lime.

Sun Oil Co.'s No. 1 Halley, 2,200 ft. from N and 440 ft. from E, Sec. 24, Blk. B-12, P.S.L. Sur.
T.D. 2,656 ft., sand; recmtg. 8-in. csg.; est. 2,000,000 ft. gas per day.

Texas Pacific Coal & Oil Co.'s No. 2 Daugherty, 1,650 ft. from S and 330 ft. from E, Sec. 2, Blk. 26, P.S.L. Survey.
Drlg. 1,125 ft., anhydrite.

East Central Texas Wildcats

(Continued from Page 154)

ELLIS COUNTY

Beckner-Finley et al's No. 1 Coker, 2,900 varas along S line of grant from river and 1,700 varas N at R/A. R. De La Pena Sur.
S.D. 527 ft.

FREESTONE COUNTY

Amerada Pet. Corp.'s No. 1 Burk, 851 ft. S 125 ft. W of river, E. G. Rector Sur.
T.D. 4,025 ft. in oil sand; comp. Mar. 15, 1935; tested 22 hrs. and made 130 bbls. through 14/16-inch choke or 8⅛ bbls. in 30 mins.; Tubing pres. 920 lbs.; csg. pres. 1,250 lbs.

Daniel Oil & Royalty Co.'s No. 2 Ball, J. Y. Aquilera Sur., 1,320 ft. N and 1,390 ft. E of No. 1 Ball, or N 9 deg. 35 ft. E, 1,-905 ft. from No. 1 Ball.
Began Mar. 24; 12½-in. 103 ft.; drlg. 600 ft.

Hoover et al's No. 1 McFall, 150 ft. S and W lines, S. Garrison Sur., E of Mexia.
Location.

Clark & Cowden's No. 1 W. H. Goolsby, T.D. 4,428 ft. in SW sand; top Woodbine 4,374 ft.; dry and abnd.

GREGG COUNTY

O. T. Clark's No. 1 Williams, 2,100 ft. from S and 2,400 ft. from W of D. Hill Sur., 3 miles NE of Longview.
T.D. 3,620 ft.; W.O.

HENDERSON COUNTY

Great States' No. 1 Ansley, 1,724 ft. W and 300 ft. S of SE cor. of M. Matthews Sur., N. H. T. Thompson Sur.
Drlg. 2,300 ft.

Taubert & McKee's No. 1 M. T. Dobbs, NW cor. of east Dobbs 100-ac. tract, 4 miles E of Malahoff and S of Railroad, George Aldrick Sur.
T.D. 4,048 ft.; pulling liner; will set 100 ft. csg. on bottom.

H. M. Wilson's No. 1 fee, 970 varas S of NE cor. of 943-ac. tract, 5 miles N of Malahoff.
Derrick.

HILL COUNTY

Humble O. & R. Co.'s No. 1 Holderman, 1,667 ft. from E and 750 ft. from N line of tract in C. Sullivant Sur., 1 mile W of Mt. Calm.
T.D. 3,398 ft.; dry and abd.

HOPKINS COUNTY

D. A. Hale et al's No. 1 L. M. Hall, 200 ft. from N and E lines of 70-ac. tract, 1 mile SE of Miller Gros. A. Caro Sur.
S.D. for fuel 2,779 ft.

HUNT COUNTY

Cauble & Thompson's No. 1 Reed, 330 ft. N of northerly NE cor. of C. B. Payne Sur., but in F. Thweatt Sur., 3 miles SE of Greenville.
S.D.; waiting orders.

Shawver et al's No. 1 Phillips, 1,200 ft. E of Winan's No. 1 Phillips, University Lands Sur., 2 miles W of Commerce.
Elev. 522 ft.; T.D. 1,617 ft.

KAUFMAN COUNTY

Germany et al's No. 1 Clark, 951 ft. N and 1,000 ft. W of tract, S. Eden Sur.
T.D. 1,780 ft.; shale; S.D.

Murry & Emerson's No. 1 G. W. Martin, 1,660 ft. from W and 250 ft. from N of 140-ac. tract, from W. L. C. Butler Sur., 2 miles NE of Kemp.
S.D. 27 ft.

L. P. Kean's No. 1 J. B. Hunter, R. Sowell Sur., 300 ft. from SW and 150 ft. from SE of 50-ac. tract, 4 miles S of Terrell.
S.D. 3,214 ft.; shale and sandy shale.

LIMESTONE COUNTY

J. Edward Mills' No. 1 Hunt, 300 ft. from N, 350 ft. from W line 34.75-ac. tract, Israel Wood Sur., 3 miles NE of Kosse.
Pulling csg.; T.D. 3,637 ft.

C. F. Carter's No. 1 Dean, 660 ft. from SE and 330 ft. from SW lines of 75-ac. tract, P. Valella Sur., 3¼ miles SW of Mexia.
T.D. 1,758 ft.; bailed fresh wtr.

Crawford's No. 1 Vol DeLong.
T.D. 2,307 ft.; blowing.

Doughtry et al's No. 1 S. Welch, 150 ft from NW and 900 ft. from NE of 77.64-acre tract in A. Varilla Sur., 4 miles W of Groesbeck.
T.D. 2,310 ft.; S.D. for fuel.

Magnolia Pet. Co.'s No. 28 Boyd, 300 ft. NE of No. 26 (Wortham Field).
Loc. abnd.

Pure Oil Co.'s No. 6-S Ross, 1,500 ft. from N and 400 ft. from E of H. Ross Sur. (Mexia Field).
T.D. 816 ft.; sandy shale; dry and abd.

NACOGDOCHES COUNTY

K. L. McHenry's No. 1 E. J. Campbell, Manvel de los Santos Coy Sur., 1,500 ft. from NW cor. of 181-ac. tract, 7 miles NW Nacogdoches.
Location.

Morrow et al's No. 1 C. B. Watkins, 150 ft. from N line and 330 ft. from NW lines of 160-ac. tract, 3 miles S of Caro, H. Y. Bailey Sur.
Drlg. chalk and shale 3,915 ft.

L. & G. Oil Co.'s No. 1 Z. Rambiln, 900 ft. N and 330 ft. W of SE cor. of tract and survey, J. Simpson Sur., 12 miles NE of Nacogdoches.
T.D. 4,007 ft.; shale and sandy shale; dry and abd.

NAVARRO COUNTY

Bennett Brothers' No. 1 T. E. Stewart, 150 ft. from NE line of lease, 10 miles SW of Corsicana, Wm. R. Bowen Sur.
T.D. 1,186 ft.; S.D.

S. B. Codding et al's No. 1 Lela Kent, 450 ft. from S line and center of N and S lines of lease, 3 miles NE of Chatfield, C. B. Emmons Sur.
S.D. 1,340 ft.

W. J. Keeling et al's No. 1 J. F. Rushing 484 ft. from N line and 150 ft. from W line of 184-ac. tract, 6 miles SW of Richardson, Henry Ford Sur.
T.D. 2,881 ft.; bad csg.; will reset.

McCullough et al's No. 1 C. Berry, 330 ft. from SE cor. of 35-acre tract, 1 mile W of Dawson, William Moss Sur.
S.D. 625 ft.; arranging to resume drlg.

McGlothlin's No. 1 Dobbin, 150 ft. W and midway from N and S lines of 138-ac. tract, E. Lowry Sur., 2 miles N of Corsicana.
Coring below 2,102 ft.; D.S. test 2,070-2,102 ft.; open 12 minutes; made 520 ft. mud and fresh wtr.

McGlothlin et al's No. 1 Barnett, 1,230 ft. N and 150 ft. W of 355-ac. tract, Elisha Powers Sur.
Elev. 345 ft.; T.D. 3,930 ft.; blue shale; comp. Mar. 9; dry and abd.

Wiggins et al's No. 1 Donoho, 450 ft. from N and 1,101 ft. from E lines in John Couple Sur., SW of Corsicana.
S.D. 1,439 ft.

RED RIVER COUNTY

Dinger's No. 1 W. T. Norris, 1,000 ft. from S and 1,900 ft. from W of 400-ac. tract, Jos. Guest Sur., 1 mile S of Detroit.
8¼-in. cmtd. at 1,214 ft.; tested dry; no show.

Joiner's No. 1 D. Rust, C. C. Wilborn Sur., 234 ft. N and 254 ft. W of most southerly SE cor. of Sur., just south of Avery.
Moving in rig.

RUSK COUNTY

Brusk's No. 3 Jeff Phillips, 150 ft. from N line of survey and 700 ft. from W line of 100-ac. tract, 4 miles SE of Minden, N. Villaria Sur.
T.D. 3,673 ft.; dry and abnd.

Ben Lamb's No. 1 H. Leath, 330 ft. out of NW cor. of 185-ac. tract in L. J. Dooley Coring lime 4,306 ft.

Richardson's No. 1 Wood.
Derrick.

SMITH COUNTY

Cloud et al's No. 1 Dendall, 330 ft. from S and W of 55-ac. tract, J. Williams Sur., 3 miles E of Van Field.
Arranging to resume drilling.

Dr. Garland's No. 1 Bartlett, 330 ft. out of SE cor. of R. G. Steeart Sur., 1 mile SE of Jamestown, ½ mile E of Cloud.
Drlg. shale 2,750 ft.

W. R. Harrison's No. 1 Rushing, J. Herring Sur. (O.W.D.D.).
T.D. 4,330 ft.; S.D.; will P.B. and test again.

Peveto-Howze et al's No. 1 F. J. Watson, 150 ft. out of NW cor. of 75-ac. tract, Oliver Anderson Sur.
Base Pecan 3,866 ft.; Austin chalk 4,700-4,953 ft.; coring 5,123 ft.

Sun Oil Co.'s No. 1 Longley & Reeves, Jonathan Lindley Sur., 330 ft. out NW cor. 151.45-ac. tract, 5 miles NE Chappel Hill.
Building derrick; 330 ft. out NW cor. sur.

TITUS COUNTY

S. Rotondi's No. 1 Lillianstun, 1,200 ft. E from NW cor. of J. Bodt Sur. and 330 ft. N, but in W. H. Crawford Sur., 5 miles NE of Talco.
Elev. 301 ft.; derrick.

VAN ZANDT COUNTY

Delcambre et al's No. 2 Crim, 400 ft. from S and 150 from E lines, Nacogdoches Co. School Lands.
Changed to T. E. Gullory Co.'s No. 1 Crim; T.D. 1,327 ft.; comp. Mar. 25; I.P. pumping 5 bbls. oil per day.

Green and Winn's No. 1 Eaton, 330 ft. out of most westerly SW cor. of J. Wilson Sur., 2 miles SE of Martin.
T.D. 2,919 ft.; green sandy shale; 7-in. 2,-800 ft.; core 2,866-69 ft.; rec. 4 ft. red beds; 4 ft. sand, and 1 ft. good oil sand; W.O.C.

J. Beren et al's No. 1 Bryant, 483 ft. N of same operator's dry hole, Nacogdoches County School Land Sur.
W.O.S.R. 1,325 ft.

Beren et al's No. 2 Palmer, 544 ft. from S and 686 ft. from E of 69.5-ac. tract, Nacogdoches County School Land.
T.D. 1,324 ft.; tested slight show oil; waiting on power.

Miller et al's No. 1 J. M. Palmer, 150 ft. from S and E lines of 69-ac. tract, Nacogdoches County School Land Sur.
C.O. 1,192 ft.

Pure and Humble's No. 1 J. H. Ray, Nacogdoches School Land Sur., 150 ft. N and 150 ft. W of NE cor. of J. M. Palmer's 39-ac. tract.
Rigging up.

M. Rouch et al's No. 1 Bearden & Palmer 150 ft. out of SE cor. of 61-ac. tract, Nacogdoches C.S.L.
S.D. 1,227 ft.

WOOD COUNTY

Hill & Hill's No. 1 J. J. Phillips, 330 ft. from N and E, James M. Moore Sur., 5 miles S of Winnsboro.
Rigging up.

Southwest Texas Wildcats

(Continued from Page 152)

SE and SW lines of 2,500-ac. tract in C. Campbell Sur.
No report; 1,695 ft.

J. S. Suttle's No. 2 Baenziger, S of Seguin.
Old well; R.U. to W.O.

Suttle et al's No. 1 Baenziger.
C.O. 2,153 ft.

Seidemann et al's No. 2 Seidemann, 400 ft. from NW line, 360 ft. from NE line of 147.5-ac. tract, Esnaurrizer Sur.
T.D. 1,600 ft.; no report.

HIDALGO COUNTY

D. & D. Oil Co.'s (Clay, Spencer & Hood) No. 1 Brooks & Showers, 330 ft. N and E lines of Lot 4, Blk. 36, Por. 79-80.
Drlg. 4,360 ft.

Maxwell-Young's No. 1 King, 175 ft. N and E lines of Lot 8, Blk. 11.
T.D. 875 ft.; standing.

Downey & Morton's No. 1 Daskom, 450 ft. from E line, 55 ft. from S line of Blk. 34, Por. 45.
Drlg. 3,430 ft.

E. H. East's No. 1 Carter, 330 ft. from E line, 900 ft. from N line of Blk. 19, East Retama grant.
Coring 1,030 ft.

Nutex Oil Co.'s (Hankamer & Camp) No. 1 F. Rapp 511-ac. tract, Laguna Seca League.
Standing 125 ft.

Ernest Powell's No. 1 Geo. Moore, S end of 40-ac. tract, Porcion 42.
Drlg. 2,100 ft.

E. A. Showers' No. 1 Brocks & Showers, 660 ft. from N and E lines of Lot 11, Blk. 18, Porcion 79.
Drlg. 4,280 ft.

Union Sulphur Co.'s No. 3 American Rio Grande Land & Irrig. Co., 400 ft. from S line, 600 ft. from E line of Lot 2,082, Blk. 88, 200 ft. W of No. 2.
Drlg. 7,610 ft.

JIM HOGG COUNTY

French Oil Co.'s No. 1 Pena, 660 ft. from E line on lines of Blk. 41-42, Share 2, Sur. 574.
Drlg. 100 ft.

Miller & Pippin's No. 1 Yeager, 527 ft. S line, 150 ft. E line of Blk. 6, Sur. 20
Coring 2,581 ft.

A. Edmiston's (Southwestern Dev. Synd.) (formerly John D. Norwood) No. 1 C. W. Hellen, 330 ft. N and W lines, Sur. 48.
S.D. 1,600 ft.

Sun Oil Co.'s No. 1 Well, 1,320 ft. from S and E lines, Sur. 13.
Coring 2,560 ft.

JIM WELLS COUNTY

P. M. Evans et al's No. 1 Cristler, C of Sec. 41, I.&G.N. Sur.
No report; 3,249 ft.

Joe Lundin's No. 1 T. C. Hewitt, SE cor. Sec. 51, McKinney & Williams Sur.
Rigging up.

Maer & Shira's No. 1 Schaeffer, 1,320 ft. E of NW cor. center of Blk. 15, of subdivision of ranch.
Derrick.

KARNES COUNTY

Henderson & Harvey's No. 1 Jauer, 330 ft. from S and W lines of tract, A. Borsheimer Sur.
Moving in material.

H. A. Pagenkopf's No. 1 T. J. McAda, 330 ft. from NE and NW lines of Tract C. Martinez Sur.
Drlg. 2,584 ft.

KERR COUNTY

Meteor Oil Co.'s (Edminton & Walker) No. 1 Whitworth, 1,160 ft. from S line and 1,-333 ft. from E line of Sec. 1,439, of the H.E.&W.T. Sur.
S.D. 950 ft.

Jeff Love and Eastland Oil Co.'s No. 5-E Jeff Love, 1,500 ft. SE of No. 1 and 1,530 ft. from SE cor. and 300 ft. from N line of Sec. 1,591.
Drlg. 4,650 ft.

KLEBERG COUNTY

Parr & Ponder's No. 1 Sam Michalk et al, 5 miles SW Kingsville.
Drlg. 809 ft. in hard rock.

LASALLE COUNTY

C. W. Benk's No. 1 Feliz, 1,900 ft. from S line, 300 ft. from W line of Sur. 47.
Drlg. 940 ft.

LEE COUNTY

Jas. E. Pederson's No. 1 Turner, 1,860 ft. from N line, 150 ft. from E line of tract, David Hudson Sur.
T.D. 6,560 ft.; P.B. to 6,150 ft.; fishing for bailer.

Stowe & Scharlach's No. 1 Otto.
T.D. 1,700 ft.; standing; moving in new boiler to deepen to Edwards lime.

LIVE OAK COUNTY

Arthur, Brunson & Hall's No. 1 W. P. Howard, 150 ft. from W line, 2,400 ft. from N line of 200-ac. tract, in B. Ayers Sur.
Drlg. 1,389 ft.

Baugh & McMillan's No. 1 Walton & Campbell, 1,500 ft. NE line and SE line of D. R. Fant Sur.
S.D. 3,214 ft.

Henderson Coquat's No. 1 Central Co., 310 ft. from S and W lines, Sec. 12, Blk. 43, Simon Subd.
Drlg. 869 ft.

Henderson Coquat's (Luling O. & G. Co.) No. 1 Rex, C of SW¼ of G.H.&H. Sur., Abst. 197, 3 miles S of Mileska.
Preparing to set surface csg. 1,200 ft.

Rowan & Hope's No. 1 L. R. George, 990 ft. from NW and SW lines of farm tract in John Ely Sur. No. A-171.
Drlg. 200 ft.

Smith & Story's No. 1 G. T. Frederick, 1,-650 ft. from railroad, 330 ft. from south-

ern N line of 420-ac., Curry Sur.
T.D. 5,208 ft.; set csg. 5,194 ft.
J. O. Whittington's No. 1 Little, 1,320 ft. NE of S cor. of M. M. Shipp Sur., 330 ft. N of S line.
Setting csg. after coring saturated sand, 5,334-44 ft.

MAVERICK COUNTY

Escher & Andrews' No. 1 Mathews, NW cor. of B. C. Flowers Sur.
Standing 615 ft.

McMULLEN COUNTY

Howard & Claunch's No. 4 Claunch, 1,800 ft. from SE line, 1,200 ft. from SW line of M. Hely Sur.
Set csg. 750 ft.; trying to complete as gas well.
Howeth & Swiger's No. 1 Rhodes, near C of Sec. 22, M. F. Lowe Sur.
Ready to spud.
Points et al's No. 1 Fahler, 2,000 ft. from S line, 2,500 ft. from W line of 1,000-ac. tract, Pittuck Sur.
Drlg. 703 ft.
Witherspoon Oil Co.'s No. 1 Lark, Blk. 110, Scrugham Sur.
Drlg. 1,190 ft.

MEDINA COUNTY

John Lind's No. 1 Jungman, 2,050 ft. from N line, 550 ft. from W line, J. Degat Sur.
Drlg. 819 ft.
Scoggins & Sanders' No. 1 L. W. Burrell 150 ft. from E line, 1,750 ft. from N line of M. E. Gage Sur. 395.
S.D. 1,880 ft.

MILAM COUNTY

H. V. Pedersen's No. 1 Sandow (formerly C. F. Drake et al's No. 1 Standard Coal Co.) 970 ft. SW line, 1,700 ft. SE line of G. L. Johnson Sur.
C.O. 1,575 ft.
Second Natl. Bank's No. 2 Ward, 700 ft. from SE line, 2,598 ft. from SW line, L. Taylor Sur.
S.D. 60 ft.

NUECES COUNTY

Magnolia Pet. Co.'s No. 1 S. Page, 190.8 ft. from W line, 196 ft. from N line of 75-ac. tract in Kinney Sur. No. 586, Sec. 8.
Drlg. 5,309 ft.

REAL COUNTY

H. J. Heartwell et al's No. 2 L. J Maby, 694 ft. from W line and 2,153 ft. from S line of A.B.&M. Sur. No. 175.
T.D. 2,837 ft.; preparing to resume drlg.

SAN PATRICIO COUNTY

Allied Minerals' No. 1-A Ramsey, 466 ft. E, 220 ft. N of SW cor. of the North B. Giddings Sur. on a 1,000-ac. tract.
Sandy shale 2,642 ft.; moving in heavier rig; S.D.
Masterson et al's (Tom Graham) No. 1 Wurzbach, 330 ft. from W line, 4,350 ft. from S line of C. C. Hornsby Sur.
Drlg. 525 ft.
Plymouth Oil Co.'s No. 1-C Welder, 10 mi. NW Sinton.
Drlg. 4,750 ft.
Stanolind O. & G. Co.'s No. 1 J. J. McMillan (Whitehurst), 165 ft. from W line, 990 ft. from N line of Lot 12, Fulton Pasture Subd., Fitzsimmons League.
Drlg. 5,460 ft.

STARR COUNTY

Armstrong, Emanuel & Adams' No. 1 S.C. C.C., 330 ft. from S and E lines of Blk. 57, Porcion 88-89.
Drilled plugs; running tubing 2,740 ft.
C. R. Borah's No. 1 A. Guerra, San Jose grant, 330 ft. from N and 150 ft. from E lines of Sec. 6 (NE part of county).
T.D. 2,740 ft.; no report.
John H. Clopton's No. 1 Roos, 13,155 ft. N of Highway 4, along E line of Por. 92, 3,300 ft. N, 80 deg 45 min. W.
T.D. 4,334 ft.; drlg. in sidetracked hole at 4,490 ft.
John H. Clopton's No. 1 Dioncia Lopez de Tijerina, Blk. 4, Tract C-14, Porcion 80.
S.D. 1,725 ft.
Crawford et al's No. 1 Hicks et al, 150 ft. SE and NE line of NW, Perdernal grant.
S.D. 1,615 ft.
Dalnwood Oil Co.'s No. 1 Guerra, 5,280 ft. W line and N line of Share 26, Porcion 70-71-72.
Location.
Geo. Lacy's No. 1 Abney, Porcoin 99; ⅛ mi. W of Vernon's No. 1.
Ready to spud.
F. D. Vernon's No. 1 G.L.&C.C.O., 330 ft. midway between N and S lines of Lot 8, Porcion 100.
Drlg. 2,900 ft.
Morris & Bryan's No. 1 Hicks & Hicks, 660 ft. NE line, 2,000 ft. SE line of 500-ac. tract, Pedernal grant.
T.D. 1,103 ft.; no report.
Conroe Drlg. Co.'s No. 1 Guerra, 330 ft. from NE and SE lines of Blk. 35, J. N. Crawford Subd., Por. 56, Jurisdiction of Mier.
T.D. 2,206 ft.; P.B. to 900 ft.; preparing to sidetrack (corrected depth).
Dale Sneed's No. 1 Y. and V. Guerra, 330 ft. W line of Por. 68, 330 ft. S line of 1,000-ac. block of N end of Por. 92, in Por. 68.
Standing 330 ft.
R. H. Vice's No. 1 Carruth, 3,690 ft. from S line, 3,300 ft. from W line, Share B-1, Por. 91-92.
T.D. 4,016 ft.; I.P. 3,000,000 ft. of gas and 3 bbls. oil per day.

TRAVIS COUNTY

Anderson's No. 1 A. D. Beham.
T.D. 510 ft.; no report.
D. Prewitt's No. 1 Ed Peterson, 150 ft. from SE and SW lines of tract, L. Kimbro Sur.
Rigging up; S.D.
C. A. Stubbs' No. 1 Julius Kerlin, 530 ft. SW line, 450 ft. NW line of 123-ac. tract in I. Lindsay Sur. No. 61.
S.D. 1,135 ft.

WEBB COUNTY

Frank E. McMillan's No. 1 Bruni, 330 ft. from S and E lines of SW¼ of SE¼ of Sur. 77.
Drlg. 3,131 ft.
Payne et al's No. 1 Hoggterp, Blk. 5, Sur. 1,110, N of Oilton.
S.D. 600 ft.
Arthur H. Wray's No. 1 Geo. Stuempke, Share 1, Brewster pasture, Galan grant.
Drlg. with spudder 600 ft.; no report.

WILLACY COUNTY

Daniel et al's (South Texas Dev. Co.) No. 1 Armendias, 1,500 ft. W of Arroya Colorado River, 1,200 ft. N of S line of Tract 4.
Drlg. 5,100 ft.

WILLIAMSON COUNTY

Gault & Mimms' No. 1 H. V. Seggren, 1,000 ft. from W line, 300 ft. from S line of 450-ac. tract, Bevil Sur.
T.D. 340 ft.; no report.
Goff et al's No. 1 Timmerman, Cartwright Sur.
No report; T.D. 318 ft.
Johnson & Ray's No. 1-B M. Oxford Smith, 600 ft. S of No. 1-A in S. Williams Sur.
S.D. 20 ft.
J. Morgan Russell's No. 1 Nelson, 1,150 ft. S line, 1,115 ft. E line of John L. Justice Sur. No. 2.
S.D. 894 ft.

ZAPATA COUNTY

F. H. Crow et al's No. 1 Daniel Yzaguirre, 330 ft. out of SW cor. Share 1, Porcion 14-15-16, D. Yzaguirre tract.
Location for 3,500-ft. test.
Danvers & Harrison's No. 1 D. A. McAskill, near N line of county.
Set and cmtd. csg. 20 ft.
H. & M. Oil Co.'s (Virginia Hardee) No. 1 Slator, 514 ft. from SW line, 150 ft. from SE line of Blk. 65, Borrego grant.
Standing 22 ft.
Joe Palmer's No. 1 J. M. G. Martinez, 150 ft. SE and SW line, Blk. 27, Sur. 434.
Drlg. 1,480 ft.
Texas Royalty Investment Co.'s No. 1 N. J. Vela, 686 ft. from NE line, 300 ft. from NW line, Blk. 7, Por. 29.
Coring 2,256 ft.

Southwest Texas Proven

Week Ending March 30

CAESER—BEE COUNTY

Caesar Oil Co.'s No. 3 R. E. Miller.
T.D. 3,034 ft.; will P.B. and whipstock.

DIRKS—BEE COUNTY

Conservative Oil Co.'s No. 1 Harris, 330 ft. S of N line, 330 ft. W of E line of 30-ac. tract, J. L. Dugat Sur.
Rigging up.
Navarro's (Dirks Bros.) No. 1 J. E. Roth, 280 ft. from N line, 330 ft. from W line of 8½ of NW¼ of Sec. 7.
Abd. 3,914 ft.

TULETA—BEE COUNTY

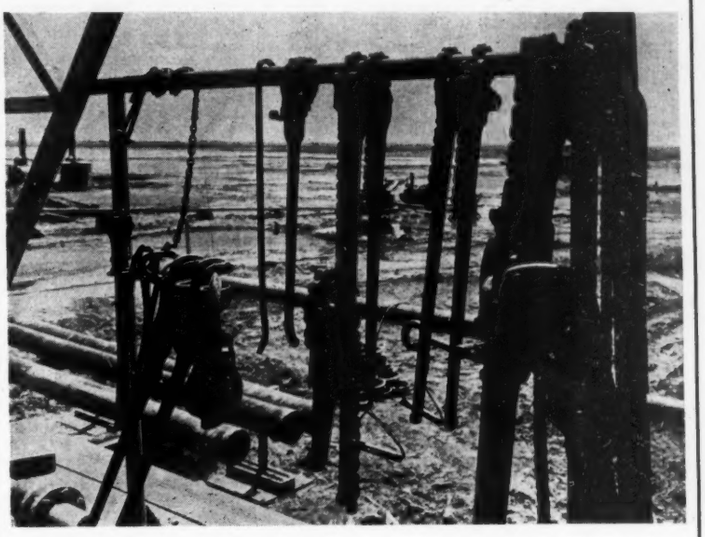
Blanco Oil Co. and Buchanan's No. 3-A Perez, 660 ft. from N line, 330 ft. from E line of SE¼ Sec. 9.
T.D. 3,891 ft.; I.P. 100 bbls. per day; small choke.
Edwin M. Jones' No. 13 Robinson, 990 ft. from S and W lines of Sec. 5.
Coring for Pettus.
Edwin M. Jones' No. 15 Robinson, Sec. 5.
Coring for Pettus, 3,928 ft.
Heyser, Heard & Walton's No. 1 fee, 50 ft. from the No. 1, SE¼ of Sec. 8.
T.D. 3,101 ft.; I.P. 50 bbls. per day.
Heyser Heard & Walton's No. 2 Perez, C of Blk. 12 of SW¼ of Sec. 8.
Set surface csg.
Mills Bennett's No. 3 Tuleta Merc. Co., 330 ft. from N line, 990 ft. from W line of SW¼ of Sec. 10.
Set csg. in sand 3,923-28 ft.; W.O.C.
Mills Bennett's No. 2 Harris, 990 ft. from W line, 330 ft. from S line of Sec. 9.
Abd. 4,293 ft.
Southwest Exploration Co.'s No. 1 Heyden & Bruckham, C of farm tract, 330 ft. from N and W lines of Sec. 20, Uranga grant.
Rigging up.
Tuleta Oil Co.'s No. 6 Skinner & Harris, 660 ft. N of No. 5, 330 ft. from W line.
Perforating 3,928-32 ft.; to complete.
Tuleta Oil Co.'s No. 7 Skinner & Harris, W½ of NW¼ of Sec. 10.
Drlg. 800 ft.
Wrightsman Oil Co.'s No. 1 Kimball, 1,200 ft. from NW line, 1,500 ft. from NE line, S. Winship Sur.
Standing 275 ft.

VON ORMY—BEXAR COUNTY

Jack Crouch's No. 5 Hoch, 330 ft. S of No. 4, Baerera Sur. No. 58.
S.D. 250 ft.
Richcul Oil Co.'s No. 1 Kohler, 1,000 ft. from N line, 155 ft. from E line of J. Vogt 96.5-ac. tract in J. M. Baerera Sur. No. 58.
S.D. 1,370 ft.
Richcul Oil Co.'s No. 1 Weilbacker, 155 ft. from E line, about 2,250 ft. S of highway in Jett Sur.
S.D. 665 ft.
Trawalter & Umburn's No. 2 Wentz, 150 ft. from S line, 700 ft. from E line of tract in John Simpson Sur.
Spudded.

GOVERNMENT WELLS POOL—DUVAL COUNTY

Mills Bennett's No. 1 W. R. Peters, 330 ft. from S and E lines of NW¼ of Sur. 178.
Abd. 3,167 ft.
Central Producers' No. 3 Wendt, 330 ft. from S line, 810 ft. from E line of NE¼ Sur. 43.
T.D. 2,319 ft.; jetting 75 bbls. daily.
Gov. Wells Oil Co.'s No. 16 State, 330 ft. from S and E lines of SW¼ of SE¼ of Sur. 48.
Testing 2,305 ft.
Frank Gravis et al's No. 1 C. W. Hahl, 330 ft. from S and E lines of NE¼ of Sur. 365.
T.D. 2,562 ft.; jetting 200 bbls. per day.
L. & R. O. & G. Co.'s No. 1 Hahl, 330 ft. from S and E lines of NE¼ of Sur. 63.
T.D. 2,726 ft.; I.P. 20,000,000 ft. of gas daily.
Magnolia Pet. Co.'s No. 1 C. W. Hahl, 330



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That PETOL Tools exclusively were to handle this job was no quick decision. These same operators have used all makes of tongs and wrenches, under varying conditions, throughout the territory. They compared designs, checked the material, and watched the results, job for job, month after month . . . . before they chose PETOL Tools.

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6000′ 3½" Right Hand Rental Drill Pipe Drilling-in String at Sinton, Texas.

LUCEY PRODUCTS CORPORATION

TULSA, OKLA.

ft. from N and E lines of Sur. 67.
T.D. 2,945 ft.; C.O. 3,816 ft.
Magnolia Pet. Co.'s No. 14 Hahl-Southland, 330 ft. from E line, 990 ft. from S line of NW¼, Sur. 61.
T.D. 2,316 ft.; I.P. 200 bbls. per day.
Magnolia Pet. Co.'s No. 15 Hahl-Southland, 330 ft. from E line, 990 ft. from N line of NW¼ of Sur. 61.
Drlg. 750 ft.
Magnolia Pet. Co.'s No. 12 Wilson, 990 ft. from S line, 330 ft. from E line, Sur. 136.
T.D. 2,315 ft.; I.P. 75 bbls. per day.
Magnolia Pet. Co.'s No. 13 J. O. Wilson, 330 ft. from E line, 1,650 ft. from S line of Sur. 136.
Rigging up.
Parr Oil Co.'s No. 2 Heller, 220 ft. from S and W lines of SW¼ of SE¼ of Sur. 44.
Rigging up.
Reynosa Oil Co.'s No. 3 Lundell, 330 ft. from S and E lines of NE¼ NE¼ of Sur. 66.
Spudded; (correction).
Salt Dome Oil Co.'s No. 5-B Moody, 330 ft. from N and E lines of NE¼ NW¼ of Sur. 60.
Testing 2,389 ft.
San Diego Oil Co.'s No. 1 Heller, 200 ft. from S and W lines of SW¼ of SE¼ of Sur. 44.
T.D. 2,339 ft.; I.P. 75 bbls. per day.
Southwest Drlg. Co.'s No. 2 Luptack, 330 ft. from N and E lines of N 50 acres of E 100-ac. tract in SE¼ of Sur. 41.
Drlg. 2,165 ft.
Texas Co.'s No. 2 Ruiz, 910 ft. from N line, 600 ft. from E line of S½ of Sur. 42.
Skidding derrick.

LOMA NOVA—DUVAL COUNTY

Humble O. & R. Co.'s No. 3 Ruiz, 330 ft. from W line, 2,735 ft. from S line of tract.
Rigging up.
Magnolia Pet. Co.'s No. 7 Ruiz, 1,403 ft. from SW line, 330 ft. from SE line, Sur. 574.
Drlg. 2,300 ft.

NORTH KOHLER—DUVAL COUNTY

G. G. Mortiner's No. 2-B Peters, 2,310 ft. from W line, 330 ft. from N line of SW¼ of Sur. 196.
Spudded and standing.

DARST CREEK—GUADALUPE COUNTY

Grayburg Oil Co.'s No. 14 McKean, 700 ft. from No. 13.
Drlg. 904 ft.

LUCAS—LIVE OAK COUNTY

Houston Oil Co.'s No. 31 Cartwright, 1,010 ft. N of No. 30, J. Sandman Sur.
Set 7-in. csg. 5,234 ft.; W.O.C.
Lion Oil Ref. Co.'s No. 4 McNeil, 355 ft. due S of No. 1.
Ran D.S. test 4,372-81 ft.; blew oil half way to crown block in 2½ minutes; setting csg.

SAM FORDYCE—HIDALGO COUNTY

Alamo Drlg. Co.'s No. 2 Guerra, 233 ft. from N line, 330 ft. from E line of NW 12.5 acres of S 75 acres, of Tract 254, Por. 40.
T.D. 2,125 ft.; standing.
Double D Oil Co. and Harrison's No. 1 Lula George, 150 ft. from S and W lines of SW 20 acres of Tract 13, Porcion 41.
Drlg. 1,800 ft.
Heep Oil Corp.'s No. 1 Lawrence, 226 ft. from N line, 241 ft. from E line of SE 5 acres of Tract 274, Porcion 39.
Drilled plugs and bringing well in, 2,764 ft.
Luckey, Blocker & Bishop's No. 3 Francisco Guerra, 165 ft. from S line, 630 ft. from W line of SE 20 acres of Tract 254, Porcion 39.
Drlg. 750 ft.
Moran Corp.'s No. 1 Guerra, 130 ft. from S and 330 ft. from W line of 7.5-ac. tract in Tract 254, Por. 40.
Moving in material.
Reed et al's No. 1 Smith, 164 ft. from W line, 133 ft. from N line of S 10 acres of NW 46.29 acres of Share B-3, Por. 41.
Drlg. 2,200 ft.
Reserve Oil Co.'s No. 4 Shearer (Cordell).
C.O. 2,799 ft.
Smith & Dayvault's No. 1 Seabury, 100 ft. from N line, 150 ft. from E line of 22.90-ac., Tract 256, Por. 38.
Building derrick.
Waite's (Schaefer & Mundy) No. 1 Tobasco, Ind. Dist., 35 ft. from N line, 210 ft. from E line of Tract 260, Por. 38.
Drlg. 2,310 ft.
Wheelock & Collins' No. 1 Seabury, SW cor. of SE 20 acres, Tract 256, Por. 38.
T.D. 2,779 ft.; I.P. 125 bbls. per day; 600 lbs. tubing pressure.

SANDIA—JIM WELLS COUNTY

O. W. Killam's No. 4 Wade, ¼ mile N of No. 3 Wade.
T.D. 4,850 ft.; P.B. to test 4,000-ft. sand.
Magnolia Pet. Co.'s No. 6 Seeligson, 660 ft. W, 330 ft. S of No. 3, Canales Sur. No. 20.
Set csg. 3,746 ft.

BURNEL—KARNES COUNTY

American Liberty Oil Co.'s No. 2 Belknap, 3,000 ft. from NW line, 840 ft. from NE line, Chas. Haynes Sur.
3,460 ft.; deepening to Yegua.
Luling O. & G. Co.'s No. 1 W. C. Boyce, 150 ft. from NW cor. of tract, J. Johnson Sur.
Moving in.
E. L. Smith Oil Co.'s No. 1 Steed, 330 ft. from NW and NE lines of 219.75-ac. tract, B.&B. Sur.
Drlg. shale 3,685 ft.

KINGSVILLE—KLEBERG COUNTY

Ray Clark's No. 1 House, Lot 5, Blk. 37, K.T.&I. Co. Sur.
Drlg. 500 ft.
Fidelity Exploration Synd.'s No. 1 Vivian Kivlin, Sec. 4, Blk. 39, K.T.&I. Sur. on Vivian Kivlin lease.
Derrick up.

JACOB POOL—McMULLEN COUNTY

Longhorn, trustee's No. 4 Lark, Blk. 4 of the Scrugham Sur.
T.D. 1,935 ft.; trying to comp.
Loma Oil Co.'s No. 35-A Jacob, midway Nos. 30 and 31, Sur. 8.
Set csg. 984 ft.; W.O.C.
Motes & Beddingfield's No. 4 Jacobs.
Set csg. to complete.
Motes & Beddingfield's No. 5 Jacobs.
Set csg. to complete.
Texas Pet. Co.'s No. 1 Wulf, 1,000 ft. from N line, 200 ft. from E line, Two Rivers Subd.
Dry and abd. 1,428 ft.

SINTON—SAN PATRICIO COUNTY

Humble O. & R. Co.'s No. 1 Welder, 2,400 ft. from N and E lines of 300-ac. lease.
Drlg. 6,395 ft.

ANGELITA—SAN PATRICIO COUNTY

Plymouth Oil Co.'s No. 3-A Welder.
Set surface csg.

LOS OLMOS—STARR COUNTY

H. L. Curry's No. 1 Bass, 835 ft. E line, 2,522 ft. N line of Sur. 8, Por. 75-76-77
No report; 1,400 ft.
J. P. Kennedy's No. 1 Kelsey-Bass, 200 ft. SE of No. 7 Kelsey-Bass in Blk. 7 of Porcions 75, 76 and 77.
Standing 710 ft.

BARBACOAS—STARR COUNTY

Merren Bond et al's No. 4 S.C.C.C., 330 ft. from N and E lines of S 20 acres of Blk. 24, of the Jeffries Lambeth Subd., Por. 89, S.D. 4,212 ft.; P.B. and sidetracked; preparing to test after coring sand 2,834-41 ft.

RIO GRANDE CITY—STARR COUNTY

Goodwin et al's No. 1 Pena, 150 ft. from SE and SW lines of Share 80, Por. 81.
Drlg. 1,600 ft.
R. M. Mitchell's No. 1 Salinas, 188 ft. from N line, 800 ft. from W line, Blk. 2, Share 39, Por. 80.
Resumed drilling; 1,000 ft.
Sioux Oil Co.'s No. 6 Goodrich, 150 ft. from S and W lines, Blk. 13, Tract 5, Por. 81.
Rigging up.
Sioux Oil Co.'s No. 7 Goodrich, Blk. 3, Tract 5, Porcion 81.
Rigging up.

SAXET—NUECES COUNTY

Southern Mineral Corp.'s No. 4 Ocher, 1290 ft. S line and 417 ft. E line of Ocher 202.52-ac. tract in Sec. 8.
Derrick.

WEST COLE POOL—WEBB COUNTY

American Liberty Oil Co.'s No. 15-A Bruni, 413 ft. from NE line, 260 ft. from SE line, Blk. 40, Sur. 5.
Coring for sand 3,375 ft.
Associated Oil Co.'s No. 2 Bruni, 330 ft. from NW and SW lines of tract, Sur. 7, Arispe grant.
T.D. 3,405 ft.; I.P. 30 bbls. per hr.
Ross Barnhart's No. 1 de la Garza, 1,500 ft. from N line, 200 ft. from E line of Sur. 262.
Drlg. 2,180 ft.
CarolinaTexas O. & G. Trust, Inc.'s No. 11 S. Benavides, 150 ft. from S line, 600 ft. from W line, Blk. 12, Sur. 683.
S.D. 3,516 ft.
Cole Pet. Co.'s No. 92 Benavides, 330 ft. from N and E of E cor. of Callaghan Tract on Sur. 6.
Rigging up.
Highland Oil Co.'s No. 2 Bruni, 330 ft. from NW and NE lines of tr. in Sur. 7.
T.D. 3,408 ft.; I.P. 30 bbls. per hr.
Highland Oil Co.'s No. 3 Bruni.
Drlg. below surface csg.
O. W. Killam's No. 1-A Bruni, 275 ft. from N line, 200 ft. from W line of Blk. 55, Brown Subd., Albercas grant.
T.D. 2,352 ft.; P.B. to 2,100 ft.; shooting again at 2,352 ft.
O. W. Killam's No. 32 Bruni, 260 ft. from SE line, 418 ft. from NE line of Blk. 28, Sur. 8.
3,425 ft.; to core deeper.
O. W. Killam's No. 34 Bruni, 236 ft. from SW line, 330 ft. from SE line, Sur. 6.
Derrick.
Magnolia Pet. Co.'s No. 8-A Benavides, 159 ft. from N and E lines of NW¼ of NE¼ of Sur. 660.
T.D. 2,351 ft.; I.P. 50 bbls. per day.
Magnolia Pet. Co.'s No. 10 Brennan Benavides, 53 ft. from NE line, 330 ft. from SE line, Blk. 488.
Drlg. 800 ft.
Peerless-Seeligson's No. 2 Bruni, 940 ft. from NE line, 260 ft. from SE line Blk. 14, Sur. 5.
T.D. 3,418 ft.; I.P. 20 bbls. per hr.
J. E. Thomas' No. 6 Gates, 2,377 ft. from N line, 200 ft. from E line, Sur. 63.
Drlg. 400 ft.
Tide Water Oil Co.'s No. 1 Bruni.
T.D. 3,405 ft.; I.P. 25 bbls. an hr.; 3/16-in. choke.
Sun Oil Co.'s No. 6 Bruni, 260 ft. from SE line, 418 ft. from NE line, Blk. 15, Sur. 5.
T.D. 3,433 ft.; P.B. to 3,425 ft.; W.O.C.

RIVERSVILLE—WILLIAMSON COUNTY

Coffield & Lanning's No. 3 Heap, 200 ft. from N line, 225 ft. from W line of tract in White Sur.
Location.
R. R. Ogden's No. 1 Matteck, 150 ft. N and W lines of 108.5-ac. tract in White Sur.
Location.

GOPHER—ZAPATA COUNTY

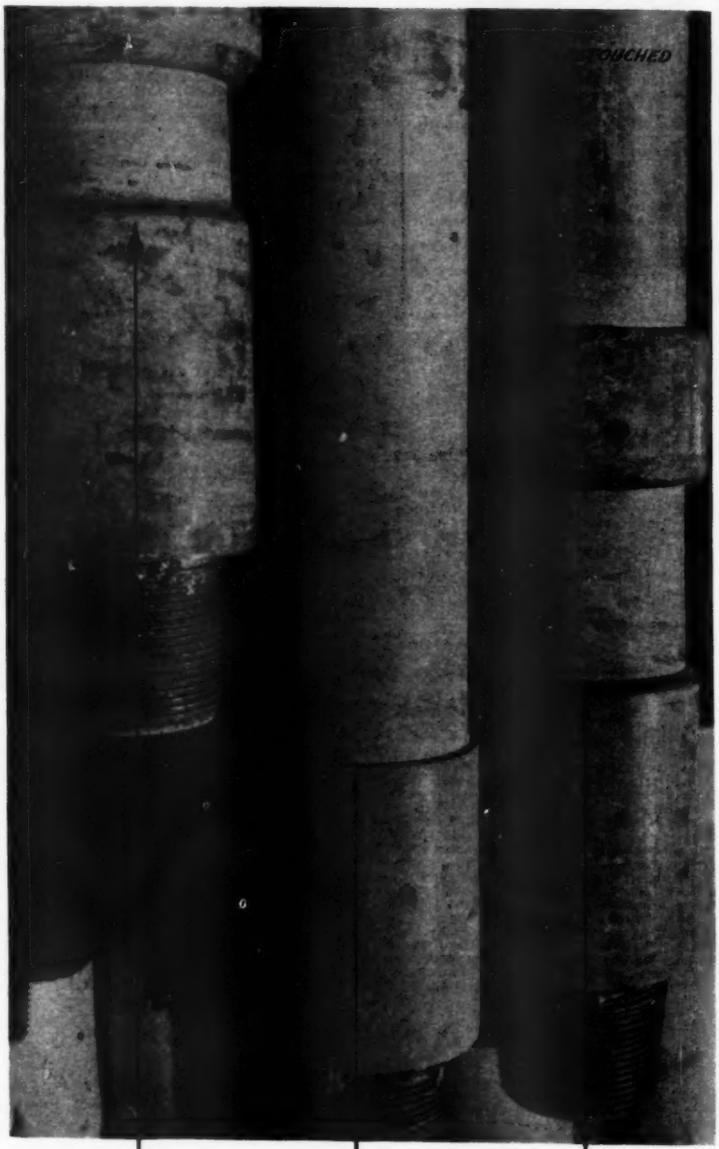
O. W. Killam's No. 2 Bruni, 5,700 ft. from NW line, 2,615 ft. from NE line of Borrego grant.
T.D. 2,180 ft.; P.B. to 340 ft.; sand.

JENNINGS—ZAPATA COUNTY

Texas Co.'s No. 65 Whitehead, 19,907 ft. from SW line, 5,537 ft. from SE line, Cerrito Blanco grant.
Spudded.

LOPENO—ZAPATA COUNTY

Alva J. Niles' No. 5-C Trevino, 150 ft. from E line, 156 ft. from N line, Blk. 15, Sur. 412.
No report; 700 ft.
Norden & Morris' No. 1 Vela, 1,320 ft. from NE line, 660 ft. from SE line, Blk. 6, Por. 20.
T.D. 2,319 ft.; I.P. 40,000,000 ft. of gas; 1,010 lbs. rock pressure.



PROTECTED
Note the bevel on the Tool Joints. Not worn. The P.B. Protectors prevented abrasion.

NOT PROTECTED
Note the worn Tool Joint. Bevel is completely worn away. *Not* equipped with a P.B. Protector.

PROTECTED
Note the bevel on the Tool Joints. Not worn. The P.B. Protectors prevented abrasion. Rapid wear is *imposed* on *exposed* Tool Joints.

Rapid wear is *imposed* on *exposed* Tool Joints

This unretouched photo tells its own story. Here are the ends of three pieces of drill pipe. Two pieces were equipped with Patterson-Ballagh Protectors. The pipe in the center had no protection. Its life is less than half that of the protected pipe. The longest-life Protectors are Patterson-Ballaghs, as evidenced by several hundred thousand placed in service.

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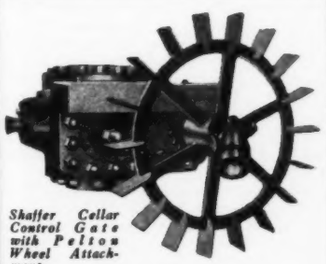

Shaffer Cellar Control Gate with Pelton Wheel Attachment.

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SHAFFER TOOL WORKS
BREA, CALIF. HOUSTON, TEX.
FOREIGN—OIL WELL SUPPLY CO.

Among Gulf Coast Drilling Contractors

Steen Drilling Co., which is now running casing in the second well in the Port Lavaca Field, being drilled for Steinberger Petroleum Co. of Houston, the discovery well in which field was drilled by Steen Drilling Co., has been reorganized and will henceforth be known as the Halliburton Oil Producing Co., Inc. Erle P. Halliburton is president, E. A. (Eddie) Steen is vice president, and Phillip Shumway is secretary-treasurer. In as much as the Steinberger well, on a drill stem test at 6,216-38 feet showed 30 thribbles and one double of 42 gravity oil, through one-quarter inch choke on bottom and three-eighth inch choke on top, thribbles being 90 feet plus in length, it is anticipated that the new organization, which controls some 2,400 acres or more in the new field, will be busily engaged in developing its properties in the field. Shortly before the reorganization the Steen Drilling Co. purchased a new type of heavy-duty drawworks and power transmission from H. L. Turney Co., the setting up of which on its first location is being anticipated by a number of engineers and practical men in the Gulf Coast. The new rig involves some exceedingly unique principles of construction, all of which are said to have been thoroughly proven in heavy logging industry of the Pacific West Coast. Control is by compressed air, and speeds are developed on the drawworks through a series of band clutches compactly arranged on a single heavy shaft. It is possible, while the two 300 horsepower Waukesha Hesselman Diesels are running full speed, to shift from one drum speed to another, either higher or lower without slightest shock or impact on any moving parts. Operation of this new rig will be closely watched by many Gulf Coast operators, as it holds much promise of introducing some mechanical principles which look good to lots of the boys.

Turnbull and Irwin have abandoned their Fort Bend County wildcat, located on the Herman Hospital 446-acre tract, at a total depth of 6,001 feet. Rig which was used on this hole will be moved to a location east of Fresno for a test on the Wood & Stone and others' block in Brazoria County. They have also made a location to drill Turnbull and Irwin's No. 1 Cox and others, in the F. S. G. Smiley Survey, in Liberty County.

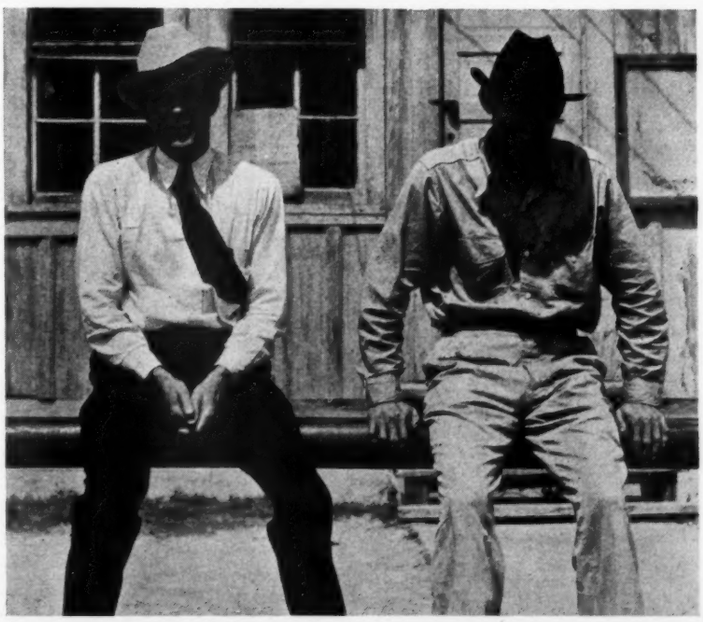
DeArman Brothers are moving a rig into Grimes County, to a location 3½ miles south of Plantersville, to drill for Anderson & Kerr a well in the Blake-Blantley Survey, which will be carried to the Cockfield, anticipated at around 4,500 feet.

Frank Long, who knows a lot about heaving shale at Sheppard's Mott (and none of it funny), leased a rig several months ago to the Smith Corp. who, despite the disastrous results which have attended all previous efforts of operators to penetrate the shale strata on this geophysical prospect, made a location about 1⅞ miles west of H. C. Cockburn's last well, which ended up in the shale. Several days ago, these operators cored oil sand from 6,130-53 feet. In reaming the rathole, the bit was stuck and could not be pulled. Pipe was shot off just above the drill collar, and all pipe recovered. After unsuccessful fishing, the hole was cemented approximately 400 feet off bottom, and will be sidetracked to reach the pay. No shale of the heaving variety was reported in this well, and operators as well as scouts have predicted that it has a very good chance of becoming the first producer on this famous geophysical prospect, first discovered by H. C. Cockburn.

W. V. (Bill) Bowles is drilling below the surface pipe on a well for the Texas Co. at Manvel, carried as Houston Oil Field Association No. 9, and has a well for Bowles & Barsodi drilling below 5,400 feet in the same field. The latter well is carried as No. 2 Norvell.

L. W. Capps is spudding a well for the Arkansas Fuel Oil Co. in Austin County, which is a wildcat to be carried to 4,000 feet. Location is 13½ miles west of Bellville, in the R. Stolze Survey.

C. & K. Drilling Co. has set 500 feet of 10-inch surface pipe in a well for themselves on a 4,000-acre block acquired from the Gulf Oil Co. near DeRidder, La. Test is scheduled to go to 6,500 feet.



Calvin Battle, superintendent, and C. A. Lee, assistant superintendent of production for the Texas Gulf Producing Co.

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Find Favorable Showing in Port Lavaca District; Deep Production Expected in Dickinson Area

By F. L. SINGLETON
Gulf Coast Bureau, The Oil and Gas Journal

HOUSTON, Tex., Apr. 1.—The favorable showing made by Steinberger Petroleum Co.'s No. 1 Shofner in the Port Lavaca area, northern Calhoun County, which offers possibilities of opening up the first crude oil production in the area, and the prospects of production being developed from a deep sand, bottomed at 9,127 feet in a test in the Dickinson Field, Galveston County, were the featured developments on the Gulf Coast the past week.

Approximately 1,500 feet west of Steen Drilling Co.'s No. 1 Stanzel, discovery well of the Port Lavaca area, northern Calhoun County, completed for a distillate producer last November, Steinberger Petroleum Co.'s No. 1 W. A. Shofner, in the M. Sanches Survey, recovered 3,456 feet of 40 gravity oil on a 24-minute drill stem test from 6,216-38½ feet, total depth, and built up 100 pounds of working pressure, through a one-quarter inch choke on bottom and a three-eighths inch choke on top. Seven-inch casing is being cemented at 6,216 feet.

On a drill stem test earlier in the week from 6,100-80 feet, approximate depth from which the discovery is producing, it showed 15 joints of mud, cut with distillate and built up 700 pounds of pressure in 13 minutes. It was cored deeper and topped the oil sand at 6,216 feet, which was cored to the total depth. Its total depth is 80 feet lower than the discovery.

If this test makes a producer, it will start considerable drilling, as nine companies own protection acreage. These include Lavaca Oil Co., Humble Oil & Refining Co., Crown Central Petroleum Corp., Magnolia Petroleum Co., Empire Gas & Fuel Co., Sun Oil Co., Mills Bennett Production Co. and Texas Co. The block on which the two wells were drilled, originally consisted of 5,200 acres, and was assembled by C. B. Polk last year. The geology was worked out by Ralph M. Sturn using surface and water well geology.

Deep Test at Dickinson

Humble Oil & Refining Co.'s No. 1 Danielson, a deep test south of production in the Dickinson Field, Galveston County, may prove to be the deepest commercial producer on the Gulf Coast. Bottomed in sand and shale at 9,127 feet, the operators made a 15-minute drill stem test from 9,042-9,127 feet and recovered 11 thribbles of oil and mud with 90 per cent oil and 4 thribbles of drilling mud, with 500 pounds of pressure through a one-quarter inch choke on top and bottom of the testing tool. Seven-inch casing has been cemented at 9,070 feet and the plug is due to be drilled early in the week. The test is reported to have had oil sand from 9,106-23 feet. The outcome may establish a new producing depth for the Gulf Coast, now held by the Bosco Field in Acadia Parish and the Roanoke Field, Jefferson Davis Parish. The deepest production in the Dickinson Field to date is from 8,016-70 feet. No. 1 Danielson is approximately one-half mile southeast of the company's No. 1 Maco Stewart, which blew out and caught fire several months ago. The company's No. 1 Schaper, 4,000 feet southwest of No. 1-B Stewart in the W. K. Wilson Survey, is coring in sandy shale below 8,736 feet.

Harris County

Two interesting wildcat tests in Harris County, were due to be tested the first part of the week after cementing casing. In the Fairbanks area, northwest of Houston, Hill and Hill's No. 1 Wharton, in Section 6, W.C.R.R. Survey, had drilled the plug and was preparing to perforate the 7-inch casing, cemented at 7,057 feet, total depth. The casing was raised to 7,049 feet before the cement was run, and will probably be perforated from 7,039-49 feet, to test the upper part of the Yegua sand indicated on an electrical coring test. No drill stem test was made. In the extreme northeastern part of the county, W. U. Paul's No. 2 House in the M. Magruder Survey, made an electrical coring test at total depth of 7,765 feet, and is expected to drill plug the first part of the week. Seven-inch casing was cemented at 7,760 feet. It is bottomed in the Yegua sand reported to have been topped at 7,524 feet.

In the Eureka Heights area, northwest of the Houston city limits, in the John Reinerman Survey, about 3,500 feet southwest of the discovery well reported last week as a possible dry hole, a drill stem test from 7,685-7,781 feet, tested 19 thribbles of mud and salt water with two joints of sand on the bottom with no pressure, through a one-quarter inch choke. The operators will probably abandon. Before the test, the operators are reported to have cored sand with a petroleum odor from 7,769-81 feet. This is the third abandonment in the area, the other two being located north and northwest of the discovery. Southeast of Houston in the Genoa area, West Production Co. has erected derrick and is preparing to spud No. 1 Woodburn, 1,320 feet east of the west line, and 2,145 feet north of the south line of the A. Whitlock Survey. Several interesting tests have been drilled on this prospect, and most all of them have encountered favorable showing of gas.

Hastings Field

In the Hastings Field, northeastern Brazoria County, another 2,100-foot extension is expected, when Stanolind Oil & Gas Co. began reaming to set 7-inch casing after coring to 6,018 feet, total depth. It is south of the discovery in the A.C.H.&B. Survey No. 2. The discovery, No. 1 J. W. Surface, worked over and drilled deeper several times, due to escaping gas, has been deepened to 6,154 feet, and the operators are reaming to cement 5-inch casing. Due north of the discovery, the company's No. 1 Wooster in the A.C.H.&B. Survey No. 1, is drilling in shale below 5,857 feet. No. 1 Miller, a 2,100-foot east extension, flowed 130 bbls. in 24 hours ending March 30, flowing through a one-eighth inch choke for 16 hours, and a five-thirty-seconds inch for eight hours, with tubing pressure 900 pounds and casing pressure 1,750 pounds.

Liberty County

Turnbull and Irwin have made location for No. 1 Cox and others in Liberty County, 1,000 feet from the east line and 200 feet from the south line of a 308.2-acre lease in the F. J. G. Smiley Survey. The test is being drilled on acreage formerly held by Gulf Production Co.

Polk County

Across the line in Polk County, Humble Oil & Refining Co. made a location on its Texas Long Leaf Lumber Co. lease in the A. Viesca Survey, 466 feet from the northeast line and 2,250 feet from the northwest line of Section 21, northwest of production in the Livingston Field. West Production Co. and Atlantic Oil Producing Co. are trying to assemble additional acreage from the Kirby Lumber Co. for a test, southeast of West Production Co.'s No. 1 Carter in the southeastern part of the county, abandoned the past two weeks. The test will probably be located if the acreage is secured in the Samuel C. Hiram or Geraldus Thomas Survey. Centering around the Elisha Stephenson Survey, it is reported H. Bergman and others of Livingston are assembling a block of approximately 3,000 acres on which a 4,500-foot hole will be drilled.

Montgomery County

Near the town of Dacus, Montgomery County, E. M. Compton and others' No. 1 Scott in the F. A. B. Wheeler Survey, is coring in shale below 3,365 feet. P. & C. Oil Co. has made location for a wildcat on the G. B. Rosebury tract in the A. M. Folks Survey, 466 feet from the north and east lines of a 160-acre tract.

One mile southeast of the town of Kinney, Paul English has made location for a Cockfield sand test on the Felix Luhn lease, in the David Chandler Survey. It is 360 feet east and 1,000 feet south from the northwest corner of the Luhn 71-acre tract.

Waller County

Over the line in Waller County, Buck Oil Co. has made location for its No. 1 Vaughn, on the San Felipe Dome, in the southwestern part of the county. It is 600 feet due east of Seaport Oil Co.'s No. 1 Vaughn, a producer in the J. McFarland Survey.

Victoria County

Two miles southwest of the Keeran Field, Victoria County, Gillespie and others' No. 1 Henderson and Pickering in the W. M. Ruply Survey, cored sand from 5,329-35 feet, and on a four-minute drill stem from 5,324-35 feet, tested dry gas with an odor of oil and built up 400 pounds of pressure through a one-quarter inch choke on bottom and a three-eighths inch choke on top. The operators are coring ahead.

Grimes County

In Grimes County, two wildcat tests are under way, 4 miles northwest of Iola, Patton and others' No. 1 Yeager, in the A. Brescoll Survey, cemented 6⅝-inch casing at 63 feet and is drilling below 660 feet, 100 feet west of the east line and 170 feet south of the line of a 53-acre tract. Three miles northeast of Singleton, Russ Petroleum Co. cemented 12-inch casing at 205 feet on its No. 1 Gibbs in the Henry Hay Survey.

SOUTH LOUISIANA

Two deep wildcat tests in Acadia and Jefferson Parishes, Louisiana, are being watched, due to showings of oil and gas. In Acadia Parish on the Crowley prospect, Humble Oil & Refining Co.'s No. 1 American Rice Milling Co. in Section 27-10s-1e, topped a sand showing gas at 9,135 feet and is fishing for the drill stem stuck at 9,129 feet. Bottom of the hole is 9,139 feet.

In Jefferson Parish, Texas Co.'s No. 1 Bayou St. Denis, Section 19-17s-24e, made a drill stem test from 8,070-90 feet, total depth, and tested 20 thribbles of oil, 24 thribbles of salt water and 18 thribbles of sand through a one-quarter inch choke on bottom, and a three-eighths inch choke on top, with the pressure showing from 20 to 25 pounds. It will probably be cored deeper.

Magnolia Petroleum Co. has made location for a deep wildcat in Cameron Parish, on its block of approximately 17,000 acres, on the J. B. Broussard 156-acre tract, 330 feet east of the NW cor. SW SE Section 13-12-9w. The block extends along the shore of the Calcasieu Lake of the Big Lake Community, several miles southeastward to Willow Lake, and reaches almost to Sweet Lake. It is 5 miles due east of the East Hackberry Field and approximately the same distance northwest of the Sweet Lake Field.

A one-quarter mile south extension to the Gillis Field, Calcasieu Parish, has apparently been made by Fohs Oil Co.'s No. 2 Castle, when it cored saturated sand from 7,010-31 feet and the operators are preparing to cement casing. This is the second well completed in the deep pay, discovered by the company, when it completed No. 1 Castle at 7,063 feet. The sand cored in the above test is approximately 30 feet higher than No. 1 Castle. Union Sulphur Co.'s No. 1 Castle in Section 13-9s-8w, is coring in hard shale and lime at 7,403 feet. The company's No. 1 Buhler, Section 11-9s-9w, is coring in hard sandy shale.

In the Roanoke Field, Jefferson Davis Parish, Humble Oil & Refining Co.'s No. 3 DeVilbiss tested salt water again, is plugged back to depth of 8,920-27 feet and the operators have plugged back to 8,746 feet and were swabbing after perforating the casing from 8,695-8,705 feet.

Wildcat Operations on Gulf Coast

Week Ending March 30

RACCOON BEND—AUSTIN COUNTY

Humble O. & R. Co.'s No. 2-X Grenau, 150 ft. from SE line, 150 ft. from SW line, Wm. Smeathers Sur.
Cored sand showing oil from 4,080-4,130 ft.; 7-in. csg. 4,053 ft.

Humble O. & R. Co.'s No. 14-X Woodley, 354 ft. W from No. 8, 418 ft. from easterly NE line, 375 ft. from most easterly N cor. of lease.
T.D. 4,152 ft.; 7-in. csg. 4,115 ft.

Humble O. & R. Co.'s No. 7-X Wilson, 2,096 ft. from SW cor., 464 ft. at R/A from SW line, Wm. Harvey Sur.
T.D. 4,323 ft.; R.U. to pump.

BLUE RIDGE—BRAZORIA COUNTY

Trans-State Oil Co.'s No. 1 Blakely, Edward Drew Sur.
Prepare to drill plug; T.D. 3,663 ft.; I.P. 140 bbls. in 24 hrs.; flowing through ¾-in. choke; tubing pressure 50 to 150 lbs.

San Jacinto Oil Co.'s No. 6 Blakely, 150 ft. N of No. 5 Blakely, Edward Drew Sur. Location.

DANBURY—BRAZORIA COUNTY

Shell Pet. Corp.'s No. 7 Blakely-Winston, 63 deg. 11 min. E, 5,540 ft. N, 26 deg 49 min. W, 200 ft. from SW cor. of Blakely-Winston 560-ac. tract, H.T.&B. Sur.
T.D. 6,253 ft.; P.B. to 6,000 ft.

Shell Pet. Corp.'s No. 3 Haury, 800 ft. SE of No. 2 in line with No. 2 and No. 1 Blakely-Winston, H.&T.B. Sur. No. 13.
T.D. 7,168 ft.; making small amount of gas.

DAMON MOUND—BRAZORIA COUNTY

Seco's No. 1-D Wisdom, 35 ft. from S and W lines of Blk. D. Lot 5. A. Darst Sur.
T.D. 1,509 ft.; prepare to pump.

Intercoastal Oil Co.'s No. 13 Wisdom, 150 ft. from NW line and 10 ft. from SW line of Lot "D," Blk. No. 51.
Spudded.

HASTINGS—BRAZORIA COUNTY

Stanolind O. & G. Co.'s No. 1 Wooten, 466 ft. S of N line, 466 ft. from SE line of 70-ac. tract, A.C.H.&B. Sur. No. 1.
Drlg. shale 5,857 ft.

Stanolind O. & G. Co.'s No. 1 Steve Paul, 476 ft. from the E line and 466 ft. from N line of 160-ac. tract, A.C.H.&B. Sur. No 2, 2,100 ft. S of discovery well.
T.D. 6,018 ft.; reaming to set 5-in. csg.

MANVEL—BRAZORIA COUNTY

Texas Co.'s No. 3 Gulf Coast Home Co., 347 ft. S, 441 ft. W from NE cor. of Lot 38, H.T.&B. Sur. No. 3-B.
Rigging up.

Bowles & Borsodi's No. 2 Norvell Invest-

(Continued on Page 184)

Lima to Be More Active Than in Years; Illinois Reports a 70 Barrel Completion

By GEORGE A. WHITNEY
Staff Correspondent, Central West Fields

FINDLAY, Ohio, Apr. 1.—The old Lima Field may soon become more active than for a number of years. In Wood County, Carl H. Schwin's No. 21 on the Hattie Brown farm, Section 29, Bloom Township, produced an initial of 6 bbls. New Deal Oil Co.'s No. 1 William Bishop farm, Section 21, same township, was dry. In Allen County, L. J. Pease and L. J. Pease, trustee's No. 5 on the Nancy E. Leedy farm, Section 14, Bath Township, produced 25 bbls. initial from the Trenton lime formation.

Van Wert County has hopes of opening a gas field. In Jackson Township, two wells are under way, Elmer Caudill & Co.'s No. 4 Mary Sheets farm, and Hystanton Oil & Gas Co.'s No. 3 J. A. Reed farm, both being close to pay sand.

In Seneca County, Tiffin Independent Gas Co. is drilling No. 2 Charles H. Feasel farm, Section 32, Liberty Township. R. E. Greene is drilling No. 3 Schaull farm.

In Sandusky County, Joseph A. Neiset & Son abandoned Nos. 4 and 7 Jacob Neiset farm, Section 8, Jackson Township, and Joseph A. Neiset abandoned No. 1 James Dolwick farm, Section 7, same township.

In Wyandot County, Upper Sandusky Oil & Gas Co.'s No. 8 O. J. Weiker farm, Section 28, Crane Township, had an initial of 2 bbls. Overbrook Oil Co.'s No. 1 Liddy Gier farm, Section 33, Tymochtee Township, is a gas well. H. H. Bosse Brothers and others are drilling below 1,200 feet on the Isaac Stansberry farm, Section 28, Salem Township. In Pitt Township, Cessne and Feasel are drilling No. 1 Thomas Bowman farm. Newcomer and others are drilling No. 5 Hiram Stalter farm, Section 22, same township. Murphy and others are drilling No. 2 Hakes and Fox farm, Section 5, Tymochtee Township. Dempsey and others are drilling No. 1 S. P. Hooper farm, Section 7, Crane Township.

Hardin County

In Hardin County, Bert Sheldon has a rig up for No. 2 on the Ora Bush farm, Section 31, Blanchard Township. Kenton Oil & Gas Co. is drilling below 250 feet in No. 3 William McMahon farm, Section 17, Pleasant. Simms Oil & Gas Co. is drilling No. 2 on the Aetna Life Insurance Co.'s land, in Buck Township.

In Marion County, Claridon Oil Co.'s No. 1 H. C. Barnhart farm, Section 11, Claridon Township, has a showing of oil in the Sylvania sand from 762-85 feet, and will be given a shot.

In Delaware County, Chester Wise is drilling No. 1 on the Herman D. Vance farm, Orange Township, below 3,280 feet.

In Sandusky County, Montgomery and others are shut down at 2,580 feet in No. 2 N. F. Hetrick farm, Rice Township. Wood & Co. are shut down at 1,100 feet in No. 5 Edward Orton farm, Section 22, Pitt Township, Wyandot County.

John Doblinger is drilling No. 2 Glen W. Lose farm, Section 8, Monclova Township, Lucas County, below 1,200 feet.

R. C. Jones' No. 2 Henry King farm, Liberty Township, Seneca County, Tiffen Field, made a light gas showing and had 100 feet of oil in hole in 24 hours and will treat the well.

INDIANA

In Gibson County, Midwest Development Corp.'s No. 4 E. F. and L. W. Gudgel farm, Section 23, Center Township, is a dry hole. Gilbert Schoulty is drilling No. 1 L. Armstrong farm, Donation 107-108, Washington Township.

In Pike County, A. E. Daviess is drilling No. 2 Frank Aurand farm, Section 20, Washington Township. Claude Noble is drilling No. 3 Ed Adams farm, NW NE Section 20, same township.

In Knox County, Gardner Petroleum Co.'s No. 1 Burton Blann farm, Section 12, Busseron Township, is a gas well, and its No. 1 Effie Taylor farm, same section, is a gas well at 617 feet. Mead Oil Co.'s No. 1 Starner Bond farm, Section 11, same township, is a gas well at 326 feet.

In Sullivan County, Dome Gas Co.'s No. 2 Z. S. Smith farm, is a gas well in Section 19, Curry Township at 277 feet.

CENTRAL OHIO

Seven completions were reported from the Central Ohio Field. In Holmes County, Ohio Fuel Gas Co.'s No. 1, Adaline McKinley farm, Section 27, Washington Township, is a gas well. Lydic Oil & Gas Co. has a rig for No. 2 Gladys McDowell farm, Section 26, Monroe Township.

In Stark County, East Ohio Gas Co.'s No. 1 R. C. Foster farm, Section 17, Plain Township, is a gas well at 4,528 feet.

In Richland County, Reed Brothers' No. 1 L. D. Durbin farm, Section 22, Jefferson Township, is a dry hole. Ohio Fuel Gas Co. is drilling No. 1 L. C. Benedict farm, Section 16, Worthington Township.

In Guernsey County, Preston Oil Co.'s No. 1 David C. Stoneburner farm, Lot 1, Willis Township, produced an initial of 19 bbls. at 1,351 feet.

In Fairfield County, City Natural Gas Works' No. 2 Webster Deeds farm, Section 34, Berne Township, is a gas well. Same company has a rig for No. 1 Mertz and Moyer farm, Section 14, Pleasants Township. Same company has a location on the Daniel Steiger farm, Section 1, Greenfield Township, and a rig for No. 4 Charles Fauble farm, Section 2, Berne Township. Same company is drilling No. 1 M. E. Bowman farm, Section 34, same township.

In Summitt County, East Ohio Gas Co. has a rig for No. 2 William Ritter farm, Section 18, Green Township. Robinson and others are drilling No. 4 Phillip Doerr farm, Section 16, Lake Township.

In Medina County, there are a number of wells drilling since Ohio Fuel Gas Co. started work for deeper sands.

In Knox County, Upham Co. has a rig for No. 1 Malvin L. Young farm, Section 21, and has a location on the J. C. Hartlett farm, Section 14, Union Township.

In Licking County, Preston Oil Co. made a location on the J. W. Livingston farm, Mary Ann Township. Long Producing Co. is drilling No. 2 William Varner farm, Section 16, Fallsburg Township, and Utica Oil & Gas Co. is drilling No. 3 Glen A. Shipley farm, Section 15, Bennington Township.

ILLINOIS

Illinois came through when Ohio Oil Co. struck a well above the average for that area. The well is No. 6 on the G. L. Tarlton farm, SE Section 28, Sugar Loaf Township, with an initial of 70 bbls. at a shallow depth of 672 feet.

In Clark County, Edward R. Phillips' No. 10 on the Sarah Phillips farm, Parker Township, struck water at 450 feet and was abandoned. F. E. Stohr and others are drilling No. 14 on the James Turner farm, Section 33, same township, and C. Hartman and others are drilling No. 1 J. T. Boughman farm, SW Section 20, in Parker Township.

In Jasper County, Richard Eke & Co. is drilling No. 1 H. Klair farm, Section 7, Ward Township.

In Lawrence County, Ohio Oil Co. abandoned Nos. 5, 6, 35, 36 C. L. Lewis farm, SW Section 20, Petty Township.

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Few Completions Made in Louisiana-Arkansas; Wildcat in Mississippi Apparently Failure

By J. R. CRUMPTON
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., Apr. 1. — This division went through an ordinary week of routine drilling, one development of interest being a wildcat failure in Mississippi which had been watched closely after a reported show of gas several weeks ago. There is a growing tendency by operators to drill deeper in old fields which have been producing from shallower depths.

NORTH LOUISIANA

This district reported four completions, consisting of one oil well and three dry holes. About 2 miles northeast of production in the shallow Blanchard gas field, Caddo Parish, Louana Oil & Gas Co.'s No. 1 W. H. Lindsey, Section 35-19-16, encountered salt water and the hole was abandoned at 928 feet. The same company has derrick up for a new test about 1 mile southwest of production in Section 8-18-16. In the Pine Island area of the Caddo Field, V. & F. Oil Co.'s No. 2 Etchison, Section 16-20-15, was the only producer in this district during the week, pumping 40 bbls. daily from 2,203 feet. In old Naborton area, DeSoto Parish, Ben F. Smith's No. 1 Bonds, Section 23-12-11, was dry and abandoned at 2,797 feet after coring and testing from 2,568 feet where 7-inch casing was set. The Urania Field, LaSalle Parish, registered a failure after several fair wells had been completed in a renewal of drilling. F. A. Trichelle's No. 1 Urania Lumber Co., Section 3-9-1e, was abandoned as a junked hole at 1,491 feet.

Four new locations were staked in the North Louisiana district, one of which was in wildcat territory. The second test in Madison Parish, in the northeastern part of the state, to be staked within the last few weeks is the Southern Land & Exploration Co.'s No. 1 Delhi Investment Co. in Section 1-17-12. This test is planned to drill to 4,500 feet and is located on a block of 40,000 acres of an original block of approximately 150,000 acres assembled by G. T. Shaw, owner of the land on which the discovery well in the Homer Field, Claiborne Parish, was brought in. The other test in Madison Parish, Frazier and others' No. 1 Frazier, Section 23-17-10e, has spudded in, set surface casing at 120 feet and drilling at 200 feet. The other three new locations in the North Louisiana district were in proven territory.

Drilling Operations

Drilling operations in this area are proceeding at an even pace. Two deep wells in the gas area of the Rodessa Field, Caddo Parish, are nearing the pay horizon. Arkansas-Louisiana Gas Co.'s No. 2 Rodessa Oil & Development Co., Section 23-23-16, on the northeastern extremity of proven gas, has set 7-inch casing at 5,501 feet. United Gas Public Service Co.'s No. 1 Fosque Unit, Section 28-23-16, set 7-inch at 5,540 feet and the same company's No. 1 Johnson Unit, Section 26-23-16, is making good progress, drilling at 3,820 feet. A wildcat north of Vivian in the northwestern part of Caddo, W. T. Bell and others' No. 1 Bostick, Section 12-22-16, have finally succeeded in fishing bailer from the hole at 2,754 feet and bailing to test from that depth. Southeast of Logansport on the western edge of DeSoto Parish, Hester and others' No. 1-A T. R. Alston, Section 11-11-16, on drill stem test from 2,570-2,600 feet developed six joints of oil and 11 fourbles of salt water and the test is shut down waiting orders at 2,600 feet. The test is a short distance from a previous one which was junked and abandoned a few months ago.

West of the Homer Field, Claiborne Parish, J. C. King's No. 1 Odis Webb, Section 21-21-8, logged the top of the Nacatoch at 1,871 feet and the base at 1,895 feet and is shut down at the latter depth. It is not known at this writing whether a test was made of the Nacatoch sand or if the hole will be drilled deeper to the Blossom, another producing horizon in the Homer Field. An interesting wildcat in the northwestern part of DeSoto Parish, E. B. Bird and others' No. 1 A. D. John, Section 20-14-16, encountered the top of the Nacatoch at 1,175 feet and is drilling ahead. A test 1 mile northwest of chalk rock production in the Converse Field, Sabine Parish, which had drilled to a total depth of 3,409 feet, Lawson-Leavell & Bryant's No. 1 Whiting Corp., Section 5-9-13, has cemented back to 2,100 feet for a test of shallow production. The well tested dry at 3,196 feet at the total depth.

ARKANSAS

This district did not report a completion and only one new operation, but a number of deep tests in old proven areas are holding the center of attention. H. L. Hunt's No. 15 E. F. Gregory, Section 10-17-14, in the Rainbow Field northeast of El Dorado, is the deep test in the spotlight at the present time. Failure to get the desired production in the new producing zone in the red beds at 3,428 feet, the well has been carefully drilled with constant coring to a total depth of 5,765 feet. Last week 3 feet of hard sand was cored from 5,762-65 feet and since that time the well has been deepened and 7-inch casing set at 5,834 feet. Reliable information on the test is practically impossible to get as the operators are not putting out the dope, but a good supposition is that a long string of casing would not have been cemented in the hole unless a good core had been cut. As the drilling report two weeks ago showed coring red beds from 5,620-30 feet, it is believed that the drill bit has passed the base of this formation, drilled through anhydrites and is now in the Trinity zone.

Three other tests in Union County fields to be drilled to 4,500 feet or more are making good progress. About 3 miles east of the Urbana Field, Joe Modisette and others' No. 1 J. M. Gibson, Section 6-18-13, made a drill stem test with a good show of gas from 2,526-36 feet, but decided to make a deeper test and is temporarily shut down for repairs at 3,169 feet. South of the El Dorado East Field, Earl Patterson's No. 1 C. L. Smith, Section 29-17-14, a proposed 4,500-foot test is drilling at 2,360 feet. The fourth deep test in this area, and one with no definite depth attached to it, is Gulf Refining Co.'s No. 49 Louis Werner, Section 5-16-15, Smackover Field, drilling in hard sand at 3,471 feet.

Other drilling operations in South Arkansas follow: In Arkansas County Garn Prairie Realty Co.'s No. 1 Fischer, Section 6-6s-4w, is coring 3,485 feet. Glenn E. McFaddin's (formerly J. D. Houseman) No. 1 Bovine Farms, Section 1-18-8, Ashley County, is drilling in shale at 2,400 feet. A new wildcat in the southern part of Columbia County, near the Louisiana line, Southern States Gas Co.'s No. 1 Piney Woods Lumber Co., Section 10-20-22, has set 10-inch surface casing at 203 feet. The test is scheduled to go to 3,500 feet. In the vicinity of the Miller County Field, C. V. Lentz, the first operator in that area, developed salt water on drill stem test in his No. 6 Dale, Section 24-15-26. The test was made from 2,849-52 feet, with the well logging 1 foot of red shale and 2 feet of sand from that depth to 2,855 feet. The recent hot spot area 5 miles west of Camden in Ouachita County is still active despite setbacks in every well drilled since the original well was brought in as a small pumper. T. J. Gaughan, driller of the first well, has staked location for his No. 3 Bragg, Section 25-13-18, and has set 10-inch surface at 81 feet. Two other wildcats from 2 to 3 miles from the discovery well have passed the discovery sand and drilling around the 2,000-foot level.

MISSISSIPPI

Pelican Oil & Gasoline Co.'s No. 1 Martin & Bender, Section 11-12n-8w, was the outstanding disappointment in this division during the past seven days. Drilled to a total depth of 3,227 feet and shut down for several weeks while titles were being cured on the block, reports were that a good gas show had been encountered. A test at that depth had barren results and after plugging back, a drill stem test from 3,074 to 3,135 feet developed 24 fourbles of salt water in 20 minutes.

Two new locations were staked in Mississippi during the past two weeks. In Clarke County, L. Beckwith and others have derrick up on No. 1 Long Bell Lumber Co., Section 10-2n-16e. The other new operation was in the Hinds County area of the Jackson gas field. Only a few wildcats are active in this district. Snow Black Petroleum Co.'s No. 1 Fox, Section 30-7n-12w, Jones County, is drilling in shale at 2,150 feet. In Warren County, near Vicksburg, H. W. Elliott and others' No. 2 R. L. Parker, Section 14-14n-1e, has set 4½-inch casing at 1,600 feet.

ALABAMA

On the tip end of a peninsula that juts out into Mobile Bay, Danciger Oil & Refining Co. reported a dry hole of their U. S. Government No. 1 at 2,564 feet. The well is located on a government reservation and is not sectionized. The only active wildcat in this state at this time is in Covington County, Geometer Production Co.'s No. 1 A. B. Culbreath, Section 8-2n-14e, drilling sandy shale in Eutaw horizon at 3,850 feet.

Wildcat Operations in Louisiana-Arkansas

(Rotary operations unless otherwise designated)

NORTH LOUISIANA

AVOYELLES PARISH

Bell Oil Co.'s No. 2 Thompson-Koltz, 450 ft. S, 350 ft. E, NW cor. Sec. 11-2n-5e.
Rigging up.

Southern Star Pet. Co.'s No. 1 O. G. Boyette, Sec. 28-3-5e.
S.D. 3,421 ft.

BIENVILLE PARISH

Saline Drlg. Co.'s No. 1 Pardee, Sec. 27-14-6.
S.D. 3,660 ft.

BOSSIER PARISH

Ark.-La. Gas Co.'s No. 2 R. O. Roy, 667 ft. S, 678 ft. E, NW cor. Sec. 18-17-11.
Set 10¾-in. 224 ft.

W. A. Kirkland's No. 1 Jarrett & McKeller, 330 ft. N and W, S cor. NW NW Sec. 3-21-13.
S.D. 1,500 ft.

Leonard Co.'s No. 1 Pearson, 250 ft. S and E, of C Sec. 22-21-14.
S.D. for fuel 2,408 ft.

Plain Dealing Synd.'s No. 1-A Bollinger, Sec. 31-23-12, 330 ft. N and E SW cor. SE NW.
Derrick.

Scott & Howard's No. 1 Sherrill, Sec. 13-19-12.
Partly rigged up and S.D.

R. L. Skidmore et al's No. 1 Davis, Sec. 12-18-13.
S.D. 1,150 ft.

CADDO PARISH

Alaska Oil Corp.'s No. 1 Dickerson, 150 ft. N and E, SW cor. NW NW.
Drlg. 1,400 ft.

Ark.-La. Gas Co.'s No. 2 Rodessa O. & Devel Co., Sec. 23-23-16.
Set 7-in. 5,501 ft.

J. Ed Bailey, tr.'s No. 1 Hartzo, NW cor. NE NW Sec. 28-22-16.
S.D. 1,236 ft.

W. T. Bell et al's No. 1 Bostick, 1,320 ft. E, 660 ft. N, SW cor. Sec. 12-22-16.
Bailing to test 2,754 ft.

Cal.-La. Devel. Co.'s No. 1 Glassell, NW NE Sec. 11-19-15.
Set 10-in. 40 ft.

Gulf Ref. Co.'s No. 8 Chew, 100 ft. N, 400 ft. E, C Sec. 33-21-16.
W.O.S.R. 1,825 ft.

Hillman et al's No. 1 J. S. Noel Est., NE NE Sec. 12-20-16.
Rigged up and S.D.

A. D. King, tr.'s No. 1 Roach, 641 ft. E, 275 ft. N, SW cor. SE Sec. 4-14-16.
S.D. 2,128 ft.

Press & Lambert's No. 1 Hughes, Sec. 15-20-15.
W.O.S.R. 2,201 ft.

Press & Lamberts' No. 1 Robertson, 300 ft. N and E, SW cor. SE Sec. 15-20-15.
Set 7-in. 2,170 ft.; T.D. 2,195 ft.

Recovery Oil Co.'s No. 1 W. L. Sibley, Sec. 15-19-14.
Fishing for D.S. 2,050 ft.

A. C. Scott et al's No. 1 Noel Est., 330 ft. S and E, NW cor. Sec. 22-20-15.
Set 7-in. 2,221 ft.; T.D. 2,241 ft.

Shreveport Oil Corp.'s No. 5-B Muslow, 150 ft. S, 1,320 ft. E, NW cor. Sec. 9-20-1s.
Rigging up.

G. R. Stevens' No. 2 Hart, Sec. 22-21-16.
Drlg. 1,020 ft.

Texas Co.'s No. 3 School fee, Sec. 16-20-15.
Tested dry 2,222 ft.; arranging to deepen.
Dlg. cable tools 2,226 ft.

Texas Co.'s No. 4 School fee, Sec. 16-20-15.
Set 10-in. 100 ft.; set 6-in. 2,159 ft.

Texas Co.'s No. 2 Thigpen, 300 ft. S and E, C Sec. 15-20-1s.
Set 10-in. 100 ft.; drlg. 2,100 ft.

C. A. Tooke's No. 1 fee, 104 ft. S and W, NE cor. SE Sec. 16-20-15.
Tested S.W. 2,195 ft.; P.B.

Tooke & Reynolds' No. 3 Levy, 300 ft. S and E, NW cor. SE NE Sec. 16-20-15.
Drlg. 1,340 ft.

V. & F. Oil Co.'s No. 2 Ethison, Sec. 16-20-15.
Comp.; pumping 40 bbls.; 2,203 ft.

CATAHOULA PARISH

Phillips et al's No. 1 Central Lbr. Co., Sec. 2-9-6e.
Arranging P.B. from 3,016 ft.

CLAIBORNE PARISH

J. C. King's No. 1 Odes Webb, 330 ft. S and E, NW cor. NW NE Sec. 21-21-8.
S.D. 1,895 ft.

E. T. Oakes' No. 1 H. W. Patton Est., 660 ft. S and W, NE cor. Sec. 1-20-5w.
Rigging up.

DESOTO PARISH

E. B. Bird et al's No. 1 A. D. Johns, 330 ft. N and W, center Sec. 20-14-6.
Drlg. 1,585 ft.

Century O. & Drlg. Co.'s No. 1 Morton, 300 ft. N and E SW cor. SE NE Sec. 27-11-14.
S.D.; W.O. 2,825 ft.

G. O. Collins' No. 1 J. H. Riggs, 450 ft. S and W, NE cor. SW Sec. 21-14-13.
Set 10-in. 40 ft.

DeSoto Pet. Co.'s No. 1 B. Y. Wemple, C S½ SE NE SW Sec. 14-12-11.
Arranging to set csg. 2,590 ft.

E. L. Foster's No. 1 Youngblood, Sec. 9-11-14.
Drlg. 2,664 ft.

P. G. Fraley et al's No. 1 G. R. Stell, 330 ft. S and W, NE cor. Sec. 5-12-16.
Rigging up.

Hester et al's No. 1-A T. R. Alston, 260 ft. S, 330 ft. W, C Sec. 11-11-16.
S.D.; W.O. 2,600 ft.

Leslie Prod. Co.'s No. 1 Ramsey, 150 ft. N and W of C Sec. 36-11-11.
Set 10-in. 45 ft.

C. T. Ruffin's No. 1 J. M. Nabors, 300 ft. S and E, NW cor. SW Sec. 32-12-11.
Reaming to bottom 2,775 ft.

Ben F. Smith's No. 1 Bonds, 200 ft. E, 500 ft. N, SW cor. Sec. 23-12-11.
Dry and abd. 2,797 ft.

National Oils, Inc.'s No. 1 B. Y. Wemple, NW SW Sec. 14-12-11.
S.D. 120 ft.

(Continued on Page 187)

Largest Wildcat Well in Michigan in Ten Years Starts New Drilling Play in Montcalm County

By PAUL A. ELLIOTT
Staff Correspondent, Michigan Fields

MUSKEGON, Mich., Apr. 1.—Unprecedented leasing activity and discussion of plans for new drilling were in progress in Central Michigan as a result of the completion of the largest wildcat oil well in the 10-year history of the state's oil industry by the J. W. Leonard Drilling Co., in Crystal Township, Montcalm County.

The new gusher, about 30 miles due south of Mount Pleasant and about 65 miles due east of the Muskegon Field, blew in Thursday, March 28, in the Dundee formation at a depth of 3,198 feet on the Otto and Goldie Durbin lease, NW NW NE Section 11-10n-5w, about 2 miles north of the resort village of Crystal on the east shore of Crystal Lake.

Oil was blown 40 feet above the standard derrick by heavy gas pressure struck with the big flow about a week after the first show was encountered at 3,185-97 feet. Drilling had been suspended at this depth and the hole swabbed with a resulting small recovery of 30 and 35 bbls. a day for the first two days. Operators were considering acid treatment to increase the flow when it was decided to drill another foot, the record flow resulting.

Drillers, assisted by a special crew of the McClanahan Oil Co., labored for about 18 hours before they succeeded in shutting in the well. The wild flow throughout a night sprayed the countryside for more than a mile distant until the drilling cable was cut, the tools left in the hole and a control head with master gate installed.

Otto Durbin, owner of the 40-acre farm upon which the new well is located, a farmer and day laborer, found himself in possession of upwards of $200 a day under present Michigan proration of 75 bbls. a day minimum and 30 per cent of the balance.

Crude of High Gravity

Under the March proration schedule the new well would be allowed to produce 1,652.5 bbls. on the basis of a daily potential of 5,000 bbls. As the crude was reported slightly higher in gravity than that from the big Porter Pool, it is expected to bring at least $1.02 per barrel, the prevailing price in Michigan.

The new well is about 5 miles directly south of two unsuccessful tests drilled last summer in Ferris Township, Montcalm County. One was Daily Crude Oil Co.'s No. 1 O. Blair, SW SE SE Section 11-1n-5w, and the other W. Hunter Atha's No. 1 Harry W. and Sarah E. Davenport, C SE NE Section 16. The former was dry at 3,335 feet and the latter at 3,404 feet, after topping the limestone at 3,330 and 3,396 feet, respectively.

Prior to the Crystal discovery the only oil production in Montcalm County was in Home Township Pool near the village of Edmore, about 11 miles north where Daily Crude Oil Co., about 18 months before, drilled two upper Traverse wells with an initial of about 1,200 bbls. each and Pure Oil Co. a third 600-bbl. well. The three are still making about 250 bbls. a day of sweet Traverse crude supplying the Sweet Oil refinery at Wyman.

Two Michigan Stray sand gassers making more than 5,000,000 feet a day open flow capacity at a depth of about 1,350 feet also were drilled during recent months in Belvidere Township, Montcalm County, by Old Dutch Oil & Gas Co. and associates, now the Michigan Exploration Co. Negotiations are now in progress to provide a market for the output of these wells and several similar gas producers in the adjoining Millbrook and Hinton Townships of Mecosta County, either through the Consumers Power Co. or through large industrial concerns in Flint.

J. W. Leonard and his associates have announced they will start immediately on a north offset on the adjoining Barger lease, while Gulf Oil Co. plans an immediate east offset.

Michigan Production

Daily production for the week ending March 16 and 23 averaged nearly 36,900 bbls., or more than 4,000 bbls. in excess of the federal allowable of 32,700 bbls. a day for March. In view of the increasing demand for Michigan crude, a considerable increase in the allowable is anticipated in April. Average daily production of more than 40,000 bbls., or double the peak during the boom days in the Muskegon Field in 1929, is anticipated as a result of the Montcalm discovery.

Completions

Eight completions added 735 bbls. of initial oil output with the probability of increases after acid treatment and nearly 10,000,000 feet a day of natural gas potential, a better record than for many weeks in Michigan to say nothing of the new 5,000-bbl. oil well. Several important shows also were encountered in uncompleted wildcats.

Wittmer Co. and Noah Andrews brought in the second largest oil well of the week when their No. 2 John Pollard Estate, C S SW SW Section 1-15n-4w, Isabella Township and County, made 500 bbls. a day initial in the Dundee formation. Located about 8 miles northwest of the Isabella Township Pool near Rosebush, the new well topped the Dundee limestone at 3,660 feet and encountered oil from 3,692 to 3,712 feet, total depth. It was drilled near the location of McClanahan Oil Co.'s No. 1 Pollard, plugged and abandoned three years ago after striking a good show in the Dundee. That was before the days of acid treatment and it might have made a commercial producer. Success in the Wittmer-Pollard is expected to bring new drilling activity.

Brehm & Bond Syndicate's No. 1 William West Estate, SE NE NE Section 25, same township, had oil in the hole and was to be treated after topping the Dundee at 3,614 feet and drilling to 3,659 feet.

Isabella County Tests

J. W. Leonard struck a quantity of oil in the Dundee in No. 2 Stanley Demski, SW SE SE Section 28-15n-3w, Denver Township, Isabella County, with prospects it would develop into a 100-bbl well with treatment. Dundee was topped at 3,589 feet and the well drilled to 3,631 feet. It is one of several wells drilled in a new producing area in the southeastern portion of Denver Township opened by McClanahan Oil Co.'s No. 1 Maria T. Sweeney last fall.

Pure Oil Co. swabbed 10 bbls. of upper Traverse oil from its deep test on the Lucy Baker lease, SW NW SE Section 15-13n-5w, Fremont Township, Isabella County, near the village of Winn. After being unsuccessful through the Dundee and Monroe to a total depth of 4,253 feet, this hole was plugged back to 3,129 feet to test a show in the upper Traverse topped at 3,118 feet several months ago before the hole was made a deep test.

Midland County

Interesting developments were recorded in three Midland County wildcats in addition to a new producer in the Porter Township Pool. Howard L. Foster and J. V. Wicklund's No. 1 Carrie Neal, SE NE SE Section 13-16n-2w, in Warren Township, south of the Beaverton Township, Gladwin County, discovery, after proving a disappointment in the Dundee, struck a show of oil in the Monroe formation at about 4,000 feet and was shut down for tankage and testing. It previously had a show in the upper Traverse at 3,468 feet after topping this first limestone at 3,106 feet. Dundee was topped at 3,823 feet with new possibilities indicated at less than 200 feet below, probably in the Monroe.

Howard F. Patterson's No. 1 David Haskins, NW NW SW Section 25-13n-2e, Ingersoll Township, another Midland County wildcat, was testing for a new show in the Monroe below 3,700 feet.

Atha Oil Co. also struck the first pay in the Dundee limestone at 3,483 feet in No. 1 Mary LaLonde, C S NW SW Section 27-13n-1e, Mount Haley Township, Midland County, an east offset to the company's No. 1 Moran, believed the discovery well of a new pool 3 to 5 miles east of the big Porter Pool. It was shut down to test this week.

Porter-Midland

Only one new producer was completed in the Porter Township Pool, McClanahan Oil Co.'s No. 3 Eliza Breu, NE NW SE Section 20-13n-1w, which made about 125 bbls. a day after topping the Dundee limestone at 3,407 feet and drilling to 3,443 feet.

Fred Turner and others' No. 3 C. L. Baxter, SE NE NE Section 22, also Porter Township, which was drilled in the previous week with a stimulated flow of 400 bbls. a day, made 256 bbls. in nine hours and 320 bbls. in 19 hours, slightly exceeding expectations.

Gas Completions

Four new gassers, all in proved areas in Isabella, Mecosta and Muskegon Counties, added a combined open flow capacity of 9,850,000 feet a day. Largest was Gordon Oil Co.'s No. 1 Tiffany, C SW NE Section 32-13n-7w, Millbrook Township, Mecosta County, which gauged 6,750,000 feet from the Michigan Stray sands topped at 1,251 and drilled at 1,259 feet, or 8 feet in. It is a west offset to the company's No. 1 Garner, which had an open flow of 4,000,000 feet a day when completed several months ago.

Two new Isabella County gassers, one in Vernon and one in Broomfield Township, aggregated 3,000,000 feet a day more.

Columbia Oil & Gas Co.'s No. 1 E. and A. Van Conant, SW SW SE Section 25-16n-4w, Vernon-Isabella, made 1,700,000 feet at a total depth of 1,300 feet, 9 feet in the Michigan Stray.

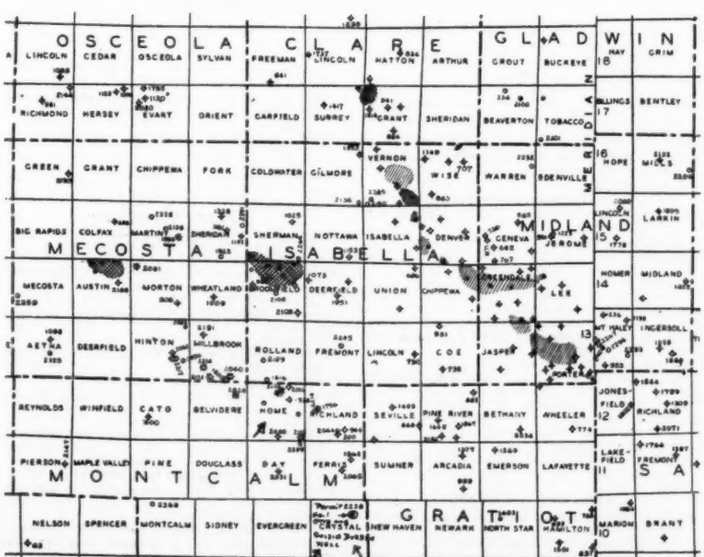
Chippewa Oil & Gas Co.'s No. 1 Carl Rhode, C SW NE Section 15-14n-6w, Broomfield-Isabella, made 1,300,000 feet, topping the Michigan Stray at 1,367 feet and drilling only 1 foot in. Same company's No. 1 Mrs. Diehl, C NE SE Section 15, Broomfield, was expected to be completed with a similar flow of at least 1,000,000 feet.

West Michigan Consumers Co., of Muskegon, topped the Monroe gas sands at 2,244 feet and struck a flow of about 100,000 feet a day in No. 1 Robert Layman, SW Section 8-10n-16w, Muskegon Township, after deepening an old Dundee oil well.

New Locations

Only three state permits were issued during the week. Two were in Porter

(Continued on Page 172)



Oil field map of the central portion of the Southern Peninsula of Michigan with new strike in Crystal Township, Montcalm County marked. This well indicates a new northwest-southeast trend similar to the line of other fields to the northeast

Another Wildcat in Rice County, Kansas, Gives Evidence of New Pool as State's Output Rises

By JAMES McINTYRE

Kansas established another new high record of daily average production during the past week when its output was at the rate of 154,900 bbls. daily, an increase of 1,850 bbls. daily over the previous week. With the large number of wildcats being drilled throughout the State, especially in the western areas, and new production being found in sufficient quantity to encourage further exploration work, continued activity over a long period is anticipated by all operators.

Estimated Production

Estimated daily average production of Kansas for the week ended March 30 and for the preceding week follows:

	Barrels	
	Mar. 30	Mar. 23
Haury-Burrton	25,152	22,700
Ritz-Canton	9,273	9,325
Hollow	4,500	5,425
Voshell	6,523	6,425
Johnson	2,225	2,218
Nikkell	5,027	5,000
Sedgwick County	10,827	10,400
Ellsworth County	6,227	4,682
Barton County	1,956	2,102
Rice County	20,825	21,990
Ellis County	470	487
Kingman County	1,160	1,034
Stafford County	1,585	2,870
Russell County	13,000	12,425
Greenwood County	11,000	11,000
Butler County	19,000	19,000
Other pools	15,850	15,867
Total Kansas	154,900	153,050

Rice County

Rice County continues to offer more reasons for speculation from a production standpoint and the past week saw another one of its wildcat wells assuming the role of a prospective pool opener. Allison and Fitzwilliam and others' No. 1 Stump, NW SW Section 4-18-10w, on a structure worked by seismograph, was running high on top of the Siliceous lime at 3,229 feet and at a total depth of 6,262 feet oil rose 600 feet in the hole in eight hours. This test is located about 2½ miles west of the town of Bushton.

In the Grove Pool of Rice County, Empire Oil & Refining Co.'s No. 1 Tournear, NW SE NE Section 29-19-9w, was completed for 538 bbls. of oil in 21 hours on the pump, production coming from the Siliceous lime at 3,200-13 feet, total depth. The lime had been acidized with 1,000 gallons.

In the same pool, Sinclair Prairie Oil & Gas Co.'s No. 2 Wallace, SE NE SW Section 29-19-9w, logged Siliceous lime at 3,215-48 feet, total depth, which put 2,000 feet of oil in the hole. It was acidized and made 746 bbls. on the pump in 24 hours for its completed gauge.

Hipple and Rogers' No. 5 Raincett, SW SE Section 3-21-6w, Welch Pool of Rice County, was completed for 491 bbls. of oil first 24 hours in Chat formation drilled from 3,353-3,418 feet, total depth.

All of the new work in Rice County the past week was in the Grove Pool. The list follows: Ira L. Keith and others' No. 3 Volkland, SW NE SE Section 20-19-9w, location; Marathon Oil Co.'s No. 2 Grove, NE NW Section 29-19-9w, location; Shell Petroleum Corp.'s No. 4 Tournear, NW NE SE Section 29-19-9w, location.

Ness County

On a structure worked and established by various means including the seismograph, magnetometer and core drill, the wildcat test of the Texas Co. and Gypsy Oil Co., No. 1 Goodman Community, C SW SW Section 21-19-23w, Ness County, was proved by the only definite means, the bit, to be void of oil. That is to say at that particular location. Log of the well showed Kansas City lime at 3,771 feet, Mississippi lime at 4,374 feet, Viola lime 4,550 feet, Siliceous lime 4,788-5,047 feet, total depth. It was dry and abandoned.

Russell County

The Texas Co.'s No. 6 Jacobs, SE NW SW Section 31-12-15w, South Fairport Pool of Russell County, was completed for 94 bbls. a day on the pump. Production came from the Oswald lime drilled from 2,978-3,065 feet, total depth, with the pay streak from 3,013-18 feet.

In the Russell Pool of Russell County, Tom Palmer's No. 6 Killian, SW SE NW Section 27-13-14w, found Siliceous lime at 3,279-92 feet, total depth, and when acidized pumped 528 bbls. of oil in 24 hours for its completed gauge.

Another producer for the Russell Pool of Russell County was had in the completion of Aylward and others' No. 1 Holland, NE cor. Section 28-13-14w, which formerly was based at 3,204 feet and deepened to 3,275 feet, present total depth, still in the Siliceous lime. It was acidized and pumped 140 bbls. in 24 hours.

Hartman and Blair's No. 1 Furthmeyer, NE cor. Section 1-14-14w, Russell County wildcat south of the Russell Pool, found the Siliceous lime from 3,325-35 feet, total depth, and the hole filled with water and the test abandoned.

Hartman and Blair's wildcat northwest of the Donovan Pool of Russell County, No. 1 Krause, NE NW NW Section 5-15-15w, got a hole full of water in the Siliceous lime topped at 3,459 feet and was abandoned at a total depth of 3,468 feet, still in the lime.

In the Sellens Pool of Russell County, Sinclair Prairie Oil & Gas Co.'s No. 2 Hefferman, SW NW NE Section 26-15-13w, was completed for 1,150 bbls. in 24 hours in the Siliceous lime logged at 3,265-68 feet, total depth. Records did not show that it had been acidized.

Failing to extend production of the Sellens Pool of Russell County, Western Exploration's No. 1 Durr, SW NW SW Section 31-15-12w, got a hole full of water in the Siliceous lime at 3,406-23 feet, total depth, and was abandoned.

Russell County drew only one new operation during the week. It was Winkler and Koch's No. 1 Herman, a wildcat location in the SE NW Section 27-12-15w, just east of the Fairport Pool.

Barton County

Materials were being moved in for Gypsy Oil Co.'s No. 1 Kultgen, NE SE NW Section 16-16-12w, Beaver Pool of Barton County.

Rush County

Southeast of the Otis gas field in Rush County, materials were being moved in on location for Morgan and Flynn and others' No. 1 Gisick, NW SE Section 25-18-16w.

Ellsworth County

Two wells were completed in the Lorraine Pool of Ellsworth County the past week, one a gas well and the other a dry hole. Bradley and Scanlon's No. 1 Nienke, NW NE NW NW Section 13-17-9w, was completed for 3,000,000 feet of gas. Total depth was 2,206 feet.

A hole full of water was encountered in the Atlantic Oil Producing Co.'s No. 1 Jansen, SW SE NW Section 13-17-9w, Lorraine Pool in Ellsworth County, the Siliceous lime from 3,241½ to 3,246 feet, total depth, filling the hole with 14 stands of water in 20 minutes. It was abandoned.

First reports in Ellsworth County the past week are as follows: Bradley and Scanlon's No. 2 Nienke, NE NW NW NW Section 13-17-9w, machine; Atlantic Oil Producing Co.'s No. 4 Rolfs, SW NE SE Section 14-17-9w, building rig; Stanolind Oil & Gas Co. and Gypsy Oil Co.'s No. 4 Frevert, C NE Section 21-16-10w, location.

Reno County

Developments in Reno County during the week resulted in the failure of one wildcat and the completion of two oil wells and four new operations in the Burrton-Haury Pool.

Playing the trend of production on the Abilene Arch in Reno County, Johnson and Carey and others got a dry hole in the Siliceous lime from 4,064-70 feet, total depth, in their No. 1 Dyck, SE NE SE Section 35-22-5w.

In the Burrton-Haury Pool of Reno County, Olson Drilling Co. and Shell Petroleum Corp. completed their No. 4 Duckworth, SW NE Section 23-23-4w, in the Hunton lime encountered from 3,600-13 feet, total depth, pumping 930 bbls. of oil in 24 hours. Seven-inch casing had been set at 3,600 feet and the Hunton lime acidized.

In the south end of the Burrton-Haury Field, Tide Water Oil Co. found Hunton lime from 3,593-3,606 feet, total depth, in its No. 1 Grandon, SE SW Section 34-23-4w, good for 1,053 bbls. in 24 hours after it had been treated with 2,000 gallons of acid.

Ponds had been dug for Barnsdall Oil Co.'s No. 10 Sabin-"B," SE SW NE Section 11-23-4w. Same company had cellar dug for its No. 11 Sabin-"B," NE SW NE Section 11-23-4w. Deal Oil & Gas Co. and others' No. 5 McElwain was a location in the NW SE SE Section 34-23-4w. Same operators had rig up for their No. 6 McElwain, SW SE SE Section 34-23-4w.

Barber County

Apparently the plan of development of Lario Oil & Gas Co.'s Barber County block in the Whelan Pool calls for a five-spot program to each 160 acres as the past week's record showed that company had staked location for its No. 2 Wheelan, in the C SE NW Section 32-31-11w. The discovery well is located in the center of the northwest quarter of the same section, and was completed in December, 1934, in the Mississippi lime for 110 bbls. of oil and 90 bbls. of water.

Materials were being moved in on location for Barbara Oil Co.'s No. 3 Lytle in the C SE NE Section 12-33-13w, Medicine Lodge Pool, of Barber County.

Sumner County

Continental Oil Co. and E. B. Shawver's No. 3 Norris, SE NE SE Section 27-34-2, southeastern Sumner County, was completed in the Chat formation logged at 3,444-3,502 feet, total depth, pumping 33 bbls. of oil in 24 hours.

New work in Sumner County consisted of E. B. Shawver's No. 1 Erker, NW SW NW Section 33-31-1w, rig up, and Barnsdall Oil Co.'s No. 4 Wenrich, NE NW NW Section 23-32-2, old total depth 2,110 feet, Kansas City lime 2,400 feet, total depth 2,452 feet, 500 feet of oil in the hole and a small show of water.

McPherson County

In the McPherson Pool of McPherson County, Tom Palmer's No. 1 Lund-

(Continued on Page 178)

Wildcat Operations in Kansas

Week Ending March 30

(Descriptions are East unless marked otherwise)

BARBER COUNTY

Sam Jarvis et al's No. 1 Morrisse, C SE NE Sec. 23-30-10w.
Rig.

Southern Drlg. Co. et al's No. 1 Davis, 330 ft. from W and 330 ft. from S lines of NE Sec 13-34-15w.
S.D. 2,866 ft.

BARTON COUNTY

D. I. Hall et al's No. 1 Arnold, SE SE SW Sec. 19-18-15w.
Moving in tools.

Lario O. & G. Co. et al's No. 1 Nuss, NW SW SW Sec. 11-16-14w.
Building rig.

Lario O. & G. Co. et al's No. 1 Nuss, NW SW SW Sec. 11-16-14w.
Rig.

McMorrow & Spencer's No. 1 Hagen, NE cor. Sec. 33-20-11w.
Drlg. 2,200 ft.

C. L. Price et al's No. 1 Ehrlich, NW SE Sec. 10-16-12w.
T.D. 360 ft.; fishing.

Pryor & Lockhart's No. 1 Herrington, NE NW Sec. 6-16-12w.
Moving in material.

Suppes & Witt's No. 1 Hayes, SW cor. Sec. 7-16-15w.
Rig.

BUTLER COUNTY

Trees & Harwood's No. 1 Henley, SW SE NE Sec. 7-24-8.
Oswego 1,915 ft.; drlg. 2,000 ft.

CLAY COUNTY

Seidel Bros.' No. 1 Younken, C S½ SE NW Sec. 21-9-4.
Mississippi lime 1,772-77 ft.; show oil and wtr.

COWLEY COUNTY

Lloyd, Frost & Study's No. 1 Weathered, SW SE SE Sec. 23-31-3.
Spudded and S.D.

A. McCoy's No. 1 Brandenburg, SW SE SE Sec. 17-34-5.
C.O. at 1,665 ft.

ELLSWORTH COUNTY

Carter Oil Co. et al's No. 1 Teuber, 440 ft. N and W of C Sec. 26-17-9w.
Siliceous lime 3,177½-78 ft.; hole full oil.

Lario O. & G. Co.'s No. 1 Wright, SW SW NE Sec. 17-16-8w.
T.D. 2,195 ft.; S.D.

Lario O. & G. Co.'s No. 1 State, SW cor. Sec. 29-15-8w.
Drlg. 630 ft.

Pryor & Lockhart's No. 1 Gregory, SE SE SE Sec. 19-16-8w.
Drlg. 2,625 ft.

Western Exploration Co.'s No. 1 Wilkins, NW SW NW Sec. 9-17-9w.
Location.

HARVEY COUNTY

Cameron, Derby Oil Co. and Trees' No. 1 Brainard, SW SE NW Sec. 19-24-2.
Spudded and S.D.

Cameron, Derby & Trees' No. 1 Brainard, SW SE NW Sec. 19-24-2.
Spud and S.D.

Goering Bros.' No. 1 Brainard, NE SW Sec. 3-23-2w.
Location.

L. W. Prunty et al's No. 1 Davis, NE cor. Sec. 6-22-1w.
Chat 2,922 ft.; drlg. 2,928 ft.

Twin Drlg. Co. et al's (O. J. Connell), No. 1 Roth, SW cor. Sec. 16-22-2w.
Drlg. 50 ft.

Wenzel et al's No. 1 Schrag, NW SE Sec. 24-22-3w.
T.D. 587 ft.; S.D. for csg.

MARION COUNTY

Youker et al's No. 1 Bernhardt, C SE NW Sec. 7-18-4.
Drlg. 2,325 ft.

McPHERSON COUNTY

Brosius et al's No. 1 Hanson, NE NE SW Sec. 15-17-2w
T.D. 1,108 ft.; S.D.

Carey & Miller's No. 1 Husband, SE SE NW Sec. 6-19-2w.
Moving in material.

Lario O. & G. Co.'s No. 1 Base, SW cor. Sec. 22-20-2w.
Wilcox 3,495 ft.; H.F.W. 3,505-10 ft., T.D.; fishing.

W. C. McBride's No. 1 Mugler, SE SW SW Sec. 22-20-3w.
Drlg. 1,669 ft.

Palmer Oil Corp.'s No. 1 Swenson, NE NE SW Sec. 11-18-3w.
Drlg. 2,145 ft.

(Continued on Page 184)

California Drilling Operations Above Last Year; Playa del Rey Still Hot Spot of Operations

By L. P. STOCKMAN
Staff Correspondent, California Fields

LOS ANGELES, Calif., Apr. 1.—Drilling operations are running far ahead of last year to date and should top the 1934 total by a wide margin unless something unforeseen develops.

The Playa Del Rey Field of Los Angeles Basin, which has undergone such a phenomenal rejuvenation during the past few months, has displaced Mountain View as California's hot spot and at the present rate will exceed the latter's potential daily production of 73,365 bbls. within another 30 or 60 days at the most.

The potential daily production of the Playa Del Rey Field has been boosted approximately 42,000 bbls. since completion of Charles W. Fourl's No. 1 Palisades, and this will be further increased within the next few days due to additional impending completions. The most remarkable feature in connection with this increased potential is the fact that these new wells, located up on the Del Rey Palisades, have shown a high sustained flow. The last five completions show an average daily potential well in excess of 7,000 bbls. each. Due to limited pipe line connections, the potential of each well is determined consecutively and the average daily production registered during a five-day open flow test is accepted as the accredited potential. Some operators in other fields are demanding that all new wells in the new eastern extension of the Playa Del Rey Field be given flow tests simultaneously as they maintain that potentials will be greatly diminished if all wells are allowed to pull on the reservoir at the same time. Those familiar with existing conditions at Del Rey disagree with this contention. As a matter of fact, the potentials chalked up by new wells up on the Palisades are of little import in as much as they are only given an allowable of approximately 300 bbls. per day each.

Prolific Completions

Mammoth Oil Co.'s No. 1 McAdams, finished last week, produced 39,331 bbls. during its five-day flow test and just about liquidated drilling costs. During the flow test this well started off doing 7,950 bbls., built up to 8,212 bbls. during the second day and then produced 8,067 bbls., 7,826 bbls. and 7,665 bbls. during the remaining three days of the test period. Other recent completions have shown prolific tendencies. Union Oil Co.'s No. 7 Vidor showed a daily potential of 7,757 bbls., D. D. Dunlap's No. 1 Palisades 8,600 bbls., Mammoth Oil Co.'s No. 1 McAdams 7,948 bbls., Charles W. Fourl's No. 1 Del Rey 5,150 bbls. and D. W. Elliott's No. 1 Del Rey 7,500 bbls., based on an open flow test of five days duration.

Limits Undetermined

The eastern limits of production in the Playa Del Rey Field are still undetermined but some definite data should be available within the next 15 days. Big Ben Oil Co.'s No. 1 Palisades is the first marker in the eastern extension because the failure to develop commercial production definitely indicated that the well was north of the productive area. This well is in the restricted area where most of the recent completions have been located and for this reason is of special importance. It is located out on the north flank of the structure, but is so close to production that it hardly seems possible that it could miss finding some indications. It is not over 1,000 feet from a well producing 7,000 bbls. per day, and for this reason it is quite probable that some further work will be undertaken as the hole must be abnormally crooked. It was surveyed once and found to have shown a deviation of 1,300 feet, but was redrilled and straightened out. There must be something wrong with the well or there is a fault located between it and present production.

The rejuvenation of the Playa Del Rey Field is due to extension work in the extreme eastern end of the field where operators have been experiencing considerable success. By a strange coincidence this section of the field was the first part of the field to be tested out but the pioneer, Milham Exploration Co., failed to drill deep enough and subsequently abandoned the test at 5,460 feet as a duster. The Mathews Petroleum Co. has acquired this lease and is making preparations to clean out the hole and resume drilling where the Milham left off. This well is located a few hundred feet east of Manchester Avenue and about 1,000 feet east of present production. The Del Rey structure is plunging sharply in the eastern end of the field and it remains to be seen whether deeper drilling will change a dry hole into a producing well.

New Wells

Two new wells were finished in the Playa Del Rey Field this week and a check indicates that one or two more potential producers will be completed within the next few days. D. W. Elliott started off the week by completing his No. 1 Del Rey flowing 1,450 bbls. per day, but this well subsequently established a potential of 7,500 bbls. As is customary, wells in this field, due to limited pipe line outlets, are brought in under wraps and given five-day flow tests as soon as the previous completion has finished its test. For this reason one must remember that initials do not represent the true potential of a well. D. W. Elliott's new producer was bottomed at 6,421 feet in Schist and finished with a 4¾-inch liner carrying 300 feet of perforated and 6,025 feet of 2½-inch tubing.

Union Oil Co.'s No. 8 Vidor followed Elliott's No. 1 Del Rey into production and is now undergoing its five-day flow test. During the initial 24-hour period following completion, No. 8 Vidor produced 1,498 bbls. of clean 22.9 gravity oil. This well looks good for at least 5,000 bbls. per day and may even go as high as 8,000 bbls. as it is building up in good shape. Drilling operations are showing a consistent increase in this field despite the fact that lessors are demanding royalties ranging from 30 to 35 per cent and in some cases cash bonuses. The Herndon Petroleum Co., which has tied up a considerable part of the potentially productive acreage in the eastern extension, is sitting on top of the world, as the company is subleasing its acreage on an over-riding royalty basis.

Kettleman Hills

Directors of the Kettleman North Dome Association have finally ratified the engineering committee's report which recommended the addition of 450 acres of proven land in the extreme western end of the field and the elimination of 170 acres in other sections of the field. Last year the committee established a purple line enclosing 16,370 acres as proved acreage and this year the committee established an orange line embracing 16,650 acres. This represents a net increase of 280 acres of proved acreage during the year. This gives the association 8,310 acres, Standard 7,800 acres and other operators 540 acres located within the new orange line. Of the 450 acres of newly proved acreage in the western end of the structure, 130 acres belong to the Standard Oil Co., 160 acres to Milham Exploration Co., 90 acres to Union Oil Co. and 70 acres to Milham Exploration and Pacific Western Oil Co. jointly.

In addition to establishing the new orange line, the engineering committee recommended the drilling of eight new wells in the North Dome during 1935. Five of the newly projected wells are to be drilled by Kenda and three by the Standard Oil Co., and three of Kenda's locations are outside of the purple line established last year. These three projects include No. 54-26-Q in the southeast section of the field on General Petroleum acreage in Section 26-22-18, No. 54-24-H in the western end of the field on acreage of the Union Oil Co. and Belmont Investment Co. in Section 24-21-16, and No. 47-18-J on acreage of the Milham Exploration Co. in Section 18-21-17. Two additional wells are scheduled to be started later in the year. These are No. 18-18-J, an offset to the Standard's No. 21-19-J recently finished flowing 8,000 bbls. per day, and No. 23-28-J in the Huffman area in Section 28-21-17, an offset to a Superior Oil Co. well. Projected wells for the Standard are No. 2-22-J in Section 27-22-17, No. 82-27-Q and No. 1 in Section 1-23-18. The last location may be changed as the location depends upon what is found in the Standard's No. 54-1-U which is now being drilled.

Mountain View

The Standard added two new wells to its list of producers in the Mountain View Field of Kern County this week by finishing No. 4 Ranton in Section 24-30-28, flowing 791 bbls. of clean 30.9 gravity oil per day, and No. 4 Wible, doing 1,102 bbls. of clean 29.8 gravity oil daily. No. 4 Ranton was bottomed at 5,478 feet and completed with a 7-inch

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	March 17		March 10			
Intercoastal-domestic—	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Fuel oil	.....	.....	.....	.....	.....	3,726,522
Diesel and gas oil	.....	.....	79,659	11,380	527,098	493,144
Gasoline	.....	.....	190,704	27,243	1,313,077	1,070,610
Kerosene	.....	.....	4,975	711	226,246	303,121
Foreign exports—						
Crude oil	103,782	14,826	266,108	38,015	1,942,312	1,565,993
Fuel oil	50,138	7,163	238,242	34,035	3,646,916	2,151,411
Diesel and gas oil	106,234	15,176	180,974	25,853	676,419	846,295
Gasoline	.....	.....	30,101	4,300	827,122	871,786
Kerosene	.....	.....	3,329	476	214,801	226,943
Other unfinished oil	.....	.....	.....	.....	37,097	34,363
Coastwise-domestic—						
Crude oil	.....	.....	76,572	10,939	1,424,652	1,227,332
Fuel oil	.....	.....	203,410	29,059	2,128,672	2,512,175
Diesel and gas oil	.....	.....	47,235	6,748	211,867	135,538
Gasoline	.....	.....	286,296	40,899	1,729,753	1,990,764
Kerosene	.....	.....	1,114	159	34,598	29,828

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	79,183	11,312	157,258	313,695
Gasoline	.....	.....	.....	.....	.....	72,625
Kerosene	.....	.....	.....	.....	149,715	160,375
Asphalt	.....	.....	.....	.....	71,325	.....
Lubricants	.....	.....	.....	.....	12,381	8,310
Foreign exports—						
Crude oil	.....	.....	175,596	25,082	533,081	445,928
Fuel oil	.....	.....	26,177	3,740	335,798	196,629
Diesel and gas oil	.....	.....	.....	.....	125,612	405,390
Gasoline	.....	.....	.....	.....	627,812	869,689
Kerosene	.....	.....	.....	.....	121,016	212,195
Lubricants	.....	.....	.....	.....	44,246	35,507
Coastwise-domestic—						
Fuel oil	.....	.....	147,196	21,028	747,591	695,769
Diesel and gas oil	.....	.....	32,194	4,599	79,662	52,262
Gasoline	.....	.....	14,718	2,103	772,672	794,638
Kerosene	.....	.....	.....	.....	10,149	29,597

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.	T.	R.	Depth	Status—
Macrate, A. N., No. 1 Athens, Los Angeles Co.	18-	3-	13	6,462	will cmt.
Republic Pet., No. 1 Lawndale, Los Angeles Co.	18-	3-	14	4,081	sd. sh. drlg.
Associated Oil Co., No. 2 Inglewood Deep, Los Angeles Co.	7-	2-	14	3,420	sd. sh. drlg.
Standard Oil Co., No. 4 Inglewood Deep, Los Angeles Co.	17-	2-	14	4,090	bailing
Standard Oil Co., No. 5 Inglewood Deep, Los Angeles Co.	17-	2-	14	6,284	suspended
Ohio Oil Co., No. 16 Del Rey, Los Angeles Co.	28-	2-	15	3,855	swabbing
Bel-Mar Oil Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	1,093	sd. sh. drlg.
Elliott, D. W., No. 1 Del Rey, Los Angees Co.	27-	2-	15	6,350	flow 6,000 b.d.
Pacific Drlg. Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	6,282	redrlg. 6,182
Stockburger, Roy, No. 1 Del Rey, Los Angeles Co.	27-	2-	15	736	cmtd.
Mammoth Oil Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	6,344	flow 8,350 b.d.
Fourl, C. W., No. 3 Del Rey, Los Angeles Co.	27-	2-	15	6,411	redrlg. 6,091
Ritelube Oil Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	4,571	sd. sh. drlg.
Mathews Pet. Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	5,460	rigging up
Royalty Service Corp., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	6,380	sd. sh. drlg.
Lor-Mar Oil Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	4,791	sd. sh. drlg.
Schirm & Thayer, No. 1 Del Rey, Los Angeles Co.	27-	2-	15	....	foundation
Union Oil Co., No. 8 Del Rey, Los Angeles Co.	27-	2-	15	750	cmtd.
Union Oil Co., No. 9 Del Rey, Los Angeles Co.	27-	2-	15	6,156	cleaning out
Union Oil Co., No. 10 Del Rey, Los Angeles Co.	27-	2-	15	2,491	sd. sh. drlg.
Big Ben Oil Co., No. 1 Del Rey, Los Angeles Co.	27-	2-	15	6,758	suspended
Doyle Pet. Co., No. 1 Manhattan, Los Angeles Co.	30-	3-	14	6,435	sd. sh. drlg.
Severns Drlg. Co., No. 1 Torrance, Los Angeles Co.	24-	4-	14	3,580	O.S. drlg.
Vanco Dev. Co., No. 1 Artesia, Los Angeles Co.	25-	3-	12	1,106	sd. sh. drlg.
Monarch Oil Corp., No. 1 Topanga, Los Angeles Co.	5-	1-	16	....	rigging up
Frontier Oil Co., No. 1 Pico, Los Angeles Co.	7-	2-	11	2,871	sd. sh. drlg.
Shively, N. O., No. 1 Puente Hills, Los Angeles Co.	23-	2-	10	3,185	cleaning out
Pressel & Tull, No. 1 Puente Hils, Los Angeles Co.	30-	2-	9	4,200	cleaning out
International Dev. Co., No. 1 Saugus, Los Angeles Co.	34-	5-	16	4,335	P.B. 4,060
Piatt & Collins, No. 1 Costa Mesa, Orange Co.	14-	6-	10	2,560	resume work
Shannon, C. G., No. 1 Yorba Linda, Orange Co.	21-	3-	9	5,777	P.B. 2,800
Great American Pet. Co., No. 2 East Coyote, Orange Co.	19-	3-	9	3,366	pump 20 b.d.
Bartholomae Oil Co., No. 2 East Coyote, Orange Co.	22-	3-	10	1,014	sd. sh. drlg.
San Diego Pet. Co., No. 1 Chula Vista, San Diego Co.	32-	18-	2	6,344	flow. water
Stephens, J. T., No. 1 Chula Vista, San Diego Co.	27-	18-	2	1,420	hd. sh. drlg.
Edmonds, E. A., No. 1 Trustee, San Diego Co.	29-	15-	3	2,431	hd. sd. drlg.
Great Coastal Oil Co., No. 1 Elsinore, Riverside Co.	36-	5-	5	880	resume work

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liner carrying 110 feet of perforated while No. 4 Wible was bottomed at 5,474 feet. The Texas Co. got a blank in No. 1 Schamblin in Section 14-30-28, as this well came in flowing 2,880,000 feet of lean gas per day upon completion at 5,235 feet. This well is not showing any water or oil and the gas only shows a gasoline content of 0.17 gallon to each 1,000 feet. Drilling operations in this field are showing a gradual but consistent decline due to some extent to the fact that many of the more favorable locations are already drilled up. The Barnsdall's deep test on the Young lease has reached a depth of 8,180 feet but has not yet encountered anything of importance. This well will probably be carried down to the 9,000-foot level for a conclusive test of the deep zone found by the Shell Oil Co. several years ago in No. 1 Porter-Day.

The Shell Oil Co. completed No. 5 Duff in the Edison Field of Kern County, Section 15-30-29, but it was good for only 110 bbls. of 23.9 gravity oil per day from 3,776 feet after the hole had been plugged back from 3,917 feet. The output of this new producer is cutting approximately 60 per cent water. Development work in 60 per cent water.

Devils Den

Richfield Oil Co. completed its No. 1 Alferitz in the Devils Den region of Kern County this week, and the well proved to be good for 149 bbls. of 18.5 gravity oil per day from 2,501 feet.. The hole was finished with an 8⅝-inch water string landed and cemented at 1,695 feet and a 6⅝-inch liner, including 805 feet of perforated. Completion of this well will lead to additional development and the area might prove of more importance than is generally expected. Up in the Midway-Sunset Field of Kern County, Pan American completed No. 50 Buena

(Continued on Page 178)

IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S. T. R.	Depth	Status—
Shell Oil Co., No. 4 Capitan, Santa Barbara Co.	5- 4-30	1,972	O.S. drlg.
Freeman, M. J., No. 1 Purisima, Santa Barbara Co.	11- 7-33	....	location
Fairview Oil Co., No. 1 Purisima, Santa Barbara Co.	18- 7-34	2,980	fishing
Advance Pet. Co., No. 1 Naples, Santa Barbara Co.	7- 4-29	5,900	hd. sh. drlg.
Barnsdall-Rio Grande, No. 10-88 Elwood, Santa Barbara.	tideland	3,162	hd. sh. drlg.
Barnsdall-Rio Grande, No. 2 Elwood, Santa Barbara Co.	15- 4-29	3,642	hd. sh. drlg.
East Elwood Pet. Co., No. 1 Elwood, Santa Barbara Co.	14- 4-29	3,767	wet, idle
Shell Oil Co., No. 1 Goleta, Santa Barbara Co.	20- 4-28	6,508	pull csg.
West Elwood Oil Co., No. 1 Goleta, Santa Barbara Co.	9- 4-28	3,200	hd. sh. drlg.
General Pet. Co., No. 4 Rincon, Ventura Co.	tideland	3,162	hd. sh. drlg.
Las Posas Pet., No. 1 Las Posas, Ventura Co.	22- 3-20	8,000	sd. sh. drlg.
Union Oil Co., No. 1 Bardsdale, Ventura Co.	12- 3-20	....	location
Oil Ridge Oil Co., No. 1 Ventura, Ventura Co.	1- 4-19	1,573	fishing
El Rancho Oil Co., No. 1 South Mountain, Ventura Co.	9- 3-19	401	cleaning out
The Texas Co., No. 128 South Mountain, Ventura Co.	4- 3-19	5,951	sd. sh. drlg.
Bolsa Chica Oil Co., No. 2 Piru, Ventura Co.	4- 4-18	1,041	hd.sh. drlg.
Continental Oil Co., No. 1 Ojai, Ventura Co.	12- 4-23	1,897	hd. sd. drlg.
Prop. Service Corp., No. 1 Lloyd, Ventura Co.	24- 3-23	7,110	show gas
Continental Oil Co., No. 4 San Miguelito, Ventura Co.	23- 3-24	....	bldg. rig
Standard Oil Co., No. 1 Lost Hills, Kern Co.	2-26-20	3,267	br. sh. drlg.
Continental Oil Co., No. 1 McDonald, Kern Co.	7-28-20	....	bldg. rig
General Pet., No. 1 South Belridge, Kern Co.	30-28-21	11,377	mill at 9,525
Standard Oil Co., No. 1-A North Belridge, Kern Co.	36-27-20	8,385	reaming
Standard Oil Co., No. 2 North Belridge, Kern Co.	36-27-20	5,882	sd. sh. drlg.
Belridge Oil Co., No. 32-35, North Belridge, Kern Co.	35-27-20	....	rigging up
Standard Oil Co., No. 1 Delano, Kern Co.	1-25-23	2,455	gas, shut in
Standard Oil Co., No. 2 Delano, Kern Co.	1-25-23	....	rigging up
Trico Oil & Gas Co., No. 1 Alpaugh, Kern Co.	3-25-23	2,525	gas well
Trico Oil & Gas Co., No. 3 Alpaugh, Kings Co.	36-24-22	3,096	sd. sh. drlg.
Trico Oil & Gas Co., No. 4 Apaugh, Kern Co.	3-25-23	....	rig, suspended
Golden Bear Oil Co., No. 1 Kern Front, Kern Co.	32-27-27	2,732	cleaning out
Hancock Oil Co., No. 5 Mountain View, Kern Co.	14-30-28	5,281	sd. sh. drlg.
Associated Oil Co., No. 1 Mountain View, Kern Co.	3-31-29	5,501	suspended
Shell Oil Co., No. 1 Mountain View, Kern Co.	32-30-29	4,483	sd. sh. drlg.
C. C. M. Oil Co., No. 1 Mountain View, Kern Co.	11-30-28	....	rig, suspended
Union Oil Co., No. 5 Mountain View, Kern Co.	15-30-28	5,474	redrlg. 4,690
Union Oil Co., No. 6 Mountain View, Kern Co.	9-30-28	6,800	sd. sh. drlg.
General Petroleum, No. 3 Mountain View, Kern Co.	14-30-28	5,495	cmtd. 5,485
The Texas Co., No. 4 Mountain View, Kern Co.	14-30-28	5,235	flow. gas
The Texas Co., No. 5 Mountain View, Kern Co.	14-30-28	5,408	cmtd. 5,333
Barnsdall, No. 3 Mountain View Deep, Kern Co.	31-30-29	8,196	sd. sh. drlg.
Hogan Pet., No. 6 Mountain View, Kern Co.	4-31-29	5,896	suspended
Hogan Pet., No. 7 Mountain View, Kern Co.	29-30-29	4,581	sd. sh. drlg.
Jergins Trust, No. 5 Mountain View, Kern Co.	24-30-28	3,400	will redrl.
Standard Oil Co., No. 5 Mountain View, Kern Co.	24-30-28	5,478	flow 500 b.d.
Standard Oil Co., No. 6 Mountain View, Kern Co.	23-30-28	5,474	O.S. drlg.
Hoyt, Otis, No. 2 Mountain View, Kern Co.	24-30-28	5,755	P.B. 5,591
Ohio Oil Co., No. 1 Mountain View, Kern Co.	32-30-29	5,999	P.B. 5,736, idle
Mountain View Oil Co., No. 1 Mountain View, Kern Co.	25-30-28	5,501	sd. sh. drlg.
Gilmore Oil Co., No. 1 Edison, Kern Co.	23-30-29	1,785	sd. sh. drlg.
Jergins Trust, No. 5 Edison, Kern Co.	14-30-29	1,600	cmtd. 1,150
Jergins Trust, No. 6 Edison, Kern Co.	13-30-29	2,800	sd. sh. drlg.
Jergins Trust, No. 7 Edison, Kern Co.	14-30-29	1,463	rig to pump
Consd. Crude Oil Co., No. 1 Edison, Kern Co.	17-30-29	5,567	sd. sh. drlg.
Shell Oil Co., No. 4 Edison, Kern Co.	15-30-29	3,776	pump 100 b.d.
Shell Oil Co., No. 5 Edison, Kern Co.	21-30-29	3,551	gr. sd. drlg.
Shell Oil Co., No. 6 Edison, Kern Co.	14-30-29	1,929	O.S. drlg.
Monterey Expl. Co., No. 7 Edison, Kern Co.	15-30-29	3,268	P.B. 3,170, idle
Chaulk Oil Co., No. 7 Edison, Kern Co.	5-30-29	2,520	sd. sh. drlg.
H. & B. Oil Co., No. 1 Edison, Kern Co.	6-30-30	980	suspended
Nelco Oil Co., No. 1 Edison, Kern Co.	5-30-29	....	rigging up
Mohawk Oil Co., No. 1 Edison, Kern Co.	3-30-29	500	sd. sh. drlg.
Foster, Inc., No. 1 Edison, Kern Co.	8-30-29	5,003	P.B. 4,950
Berry Oil Co., No. 1 Edison, Kern Co.	25-30-29	1,530	sd. sh. drlg.
General Pet., No. 4 Edison, Kern Co.	14-30-29	1,680	sd. sh. drlg.
General Pet., No. 5 Edison, Kern Co.	15-30-29	....	bldg. rig
Petroleum Drilling Co., No. 1 Edison, Kern Co.	22-29-29	1,010	sd. sh. drlg.
Petrol. Prod. Co., No. 1 Edison, Kern Co.	4-30-29	....	rigging up
Signal Oil & Gas Co., No. 1 Edison, Kern Co.	31-29-30	2,258	suspended
Signal Oil & Gas Co., No. 2 Edison, Kern Co.	31-29-30	497	cmtd.
Signal Oil & Gas Co., No. 3 Edison, Kern Co.	36-29-29	460	sd. drlg.
General Pet., No. 1 Arvin, Kern Co.	1-32-29	....	bldg. rig
Hall-Baker Co., No. 1 Arvin, Kern Co.	16-31-30	1,276	cmtd. 1,102
Sea Cliff Oil Co., No. 1 Greenfield, Kern Co.	7-31-28	3,760	redrlg. 2,800
Standard Oil Co., No. 1 Semi-Tropic, Kern Co.	8-27-23	3,200	gas, shut in
Seeple, J. O., No. 1 Elk Hills, Kern Co.	5-30-24	3,731	suspended
Richfield Oil Co., No. 2 Devil's Den, Kern Co.	14-25-18	2,501	pump 150 b.d.
The Texas Co., No. 1 Temblor, Kern Co.	29-29-21	4,571	gr. sh. drlg.
Shell Oil Co., No. 1 Buena Vista, Kern Co.	9-32-25	5,250	hd. sh. drlg.
Reserve Oil & Gas Co., No. 1 Tejon, Kern Co.	2-10-19	3,696	suspended
Reserve Oil & Gas Co., No. 2 Tejon, Kern Co.	12-10-19	1,855	rigging up
Badger Oil Co., No. 1 Tejon, Kern Co.	31-11-19	6,248	suspended
Russ Oil Synd., No. 1 Dos Palos, Fresno Co.	28-12-11	5,110	suspended
Standard Oil Co., No. 1 Coalinga, Fresno Co.	13-20-14	....	bldg. rig
Wellington Oil Co., No. 1 Coalinga, Fresno Co.	14-20-14	451	sd. sh. drlg.
Milham Expl. Co., No. 1 Ora Loma, Fresno Co.	12-12-11	....	material
Union Oil Co., No. 1 Lillis-Kettleman, Fresno Co.	24-21-16	10,944	redrlg. 6,992
K.N.D.A., No. 56 Kettleman, Kings Co.	8-22-16	10,154	redrlg. 9,823
Standard, No. 2 Kettleman Middle, Kings Co.	29-23-19	4,980	sd. sh. drlg.
Continental Oil Co., No. 1 Kettleman-South, Kern Co.	7-25-20	3,852	hd. sh. drlg.
Farrel Pet., well No. 1, San Luis Obispo Co.	18-31-12	1,432	hd. sh. drlg.
Willett Oil Co., No. 1 Cholame, San Luis Obispo Co.	19-25-15	3,660	W.&O. N.G.
Schuster, C. R., No. 1 Tulare, Tulare Co.	27-22-23	..	rig, suspended
Commonwealth Consd. Gas Co., No. 1 Tulare Lake, Kings	21-22-20	2,490	gas well
Commonwealth Consd. Gas Co., No. 2 Tulare Lake, Kings	21-22-20	....	rig, rained out
General Pet., No. 1 Devil's Den, Kings Co.	20-24-18	561	sd. sh. drlg.
Buttes Oilfields Co., No. 2 Marysville, Sutter Co.	35-16- 1	7,013	to set pipe
Amerada Pet., No. 1 F.L.D., San Joaquin Co.	15- 2- 5	....	rigging up
Pure Oil Co., No. 1 Chowchilla, Madera Co.	7-10-14	8,462	P.B. 8,035, idle
Northern Counties Pet., No. 1 Tehama, Tehama Co.	25-24- 3	2,855	gr. sd. drlg.
The Texas Co., No. 1 Petrolia, Humbodt Co.	1- 3- 2	5,000	sd. sh. drlg.
Shell Oil Co., No. 1 Branch, Monterey Co.	34-24-10	....	location

Carter Opens Misener Sand Pool as Wildcatting Operations in Oklahoma Remain at High Level

By JAMES McINTYRE

Wildcatting operations in Oklahoma continue at a high level of activity with 106 tests under way in various stages of development at the beginning of this week out of a total of 548 operations in the State. There were 53 new operations started during the past week, during which period 25 oil wells were completed with a combined initial output of 39,953 bbls. daily; 2 gas wells and 10 dry holes.

The Carter Oil Co. opened a new Misener sand pool in Seminole County when its No. 1 Black made 1,150 bbls. daily. The new pool lies between the Searight Pool and Keokuk Pool. Production for the State last week showed a decline of 21,897 bbls. daily, due to the practice of operators taking a large part of their allowable early in the month.

Estimated Production

Estimated production by pools in Oklahoma for the week ended March 30 and for the preceding week follows:

	Barrels	
	Mar. 30	Mar. 23
Allen	8,250	8,476
Asher-West Asher	1,350	1,350
Burbank	8,750	8,500
South Burbank	10,000	10,000
Balance Osage	27,500	27,500
Blackwell	4,800	4,800
Bristow-Slick	9,400	9,500
Chandler	5,650	5,750
Crescent	5,300	5,225
Cromwell	4,300	4,300
Cushing-Shamrock	12,750	13,100
Duncan dis.rict	4,200	4,050
Edmond	1,300	1,200
Fish	8,200	8,225
Fitts	14,625	12,825
Gray	1,875	1,950
Graham	3,800	3,800
Healdton	8,900	8,900
Hewitt	4,750	4,750
Holdenville	1,850	1,900
Keokuk	1,450	2,075
Konawa	2,475	3,575
Lucien	8,025	11,400
Marshall-Lovell	900	900
Oklahoma City	146,875	162,975
Papoose	1,300	1,300
Polo	4,350	4,200
Sasakwa and Townsite	2,725	2,725
Sholem-Alechem	3,950	3,950
Seminole Field:		
Bowlegs	11,525	12,575
Carr City	6,650	6,775
Earlsboro	9,100	8,850
East Earlsboro	8,925	8,975
South Earlsboro	1,025	1,125
Little River	13,250	14,450
East Little River	875	900
Maud	1,525	1,600
Mission	3,350	3,425
Seminole	10,925	11,700
East Seminole	1,175	1,200
Searight	3,575	4,125
Total Seminole	71,900	75,700
St. Louis-Pearson	23,625	25,075
Tatums	5,200	5,250
Tonkawa-Garber-Thomas	6,050	6,050
Wewoka	3,800	3,800
Yale-Jennings	4,800	4,800
Other pools	57,675	55,671
Total Oklahoma	492,650	514,547

Last Friday the Oklahoma Corporation Commission issued its order setting the state allowable daily production at 493,300 bbls. which was the same as the federal quota. The commission stated in its order that in the Class B pools, 13 were rapidly approaching the stripper stage since their per well production has declined greatly and many wells were making salt water. These 13 pools were granted permission to flow to capacity during April and they are: Simpson below Wilcox, Fault Line, Earlsboro, South Earlsboro, East Earlsboro, East Little River, Mission, East Seminole, Searight, Asher-Wanette, Maud, Allen, Sasakwa and Tatums. Following is listed the prorated pools showing each one's estimated daily demand for April and the percentage of the pool's potential:

Pool—	Allowable	Per cent
Seminole et al	41,000	51
St. Louis	25,000	38
St. Louis (water leases)		73
Sasakwa Townsite	1,700	15.5
Fish-Cromwell	5,000	70
Crescent	5,000	6
Edmond	2,000	3
Fitts Bromide	12,000	4
Fish Wilcox	3,000	4.8
Keokuk Falls	1,500	8.7
Lucien	10,000	9
Polo	3,000	7.3
Gassman	800	26

Osage County

The shallow sand in the Osage City Pool of Osage County also has its dry spots and Barnsdall Oil Co.'s No. 16, NE NE NW Section 30-21-9, finding sand at 407-22 feet, dry, the well was abandoned.

Barnsdall Oil Co.'s No. 25, NW SW NE Section 30-21-9, Osage County, logged sand 373-86 feet, total depth, and upon being given a light shot, pumped 96 bbls. It was completed.

Another nice producer for the Osage City Pool was had in Johnson Oil & Refining Co.'s No. 11, NW SE Section 30-21-9, which was completed in sand 319-38 feet, total depth, for 100 bbls. of oil on the pump after a 70-quart shot of nitroglycerin.

Pure Oil Co.'s No. 4 (old well drilled deeper), in the SE NW NE Section 25-22-7, Boston Pool of Osage County, was deepened to the Siliceous lime topped at 2,899 feet, first oil at 2,907 feet, total depth. At this depth it swabbed 15 bbls. per hour naturally and was then treated with acid increasing production to 267 bbls. for its 24 hours' completed gauge.

Wildcat Operations in Oklahoma

Week Ending March 30

NORTHERN OKLAHOMA

BECKHAM COUNTY

Fred Coogan et al's No. 1 Shelton, SW cor. Sec. 33-10-25w.
Drlg. 2,905 ft.

BLAINE COUNTY

Earl Ingrahm et al's No. 1 Masters, SW NW NW Sec. 27-16-11w.
T.D. 1,205 ft.; C.O.

CADDO COUNTY

H. W. Lee et al's No. 1 Horton, NE NE NE Sec. 9-6-13w.
Building rig.

H. W. Lee et al's No. 1 Stacey Ferrell, SW NE NE Sec. 3-6-13w; (2,000-ft. test).
Lowering 8-in. csg. 2,003 ft.; showing of oil at 1,960-2,003 ft.; S.D.

Denver Prod. & Ref. Co.'s No. 1 Noe, NW SW SW Sec. 34-10-10w.
T.D. 11,230 ft.; C.O. to 10,000 ft.; flowing by heads 100 bbls. oil every other day.

CLEVELAND COUNTY

Sinclair Prairie et al's No. 1 Franklin, SE NW SE Sec. 21-10-2w.
Drlg. 5,315 ft.

COAL COUNTY

J. D. Petty Oil Co.'s No. 1 McMillan, SW NW NE Sec. 16-1s-8.
S.D. 1,368 ft.

H. F. Potts' No. 1 Nichols, C SW SW NW Sec. 32-2-9.
Viola lime 1,702 ft.; drlg. 2,015 ft.

GARFIELD COUNTY

Herndon Drlg Co. et al's No. 1 Allen, NE NE SW Sec. 35-24-3w.
Top Mississippi lime 4,710 ft.; drlg. 4,870 ft. in lime.

GARVIN COUNTY

Anderson & Kerr et al's No. 1 Rodke, NW NW SE Sec. 17-4-1w.
Location.

Charles Carter and W. S. Key, Inc.'s No. 1 Wood, C NW SW SE Sec. 5-4-3e.
Set surface pipe.

National Prod. Co.'s No. 1 Littrell, NE NE NE Sec. 21-2-3w.
6¾-in. csg. 1,244 ft.; T.D. 1,528 ft.; S.D.

George L. Pace's No. 1 Smith, SW NE Sec. 35-1-1.
Top Springer shale 840 ft.; S.D. 1,265 ft.; (cor.).

GRANT COUNTY

Helmerich & Payne's No. 1 Crouse, C NE SW Sec. 29-25-8w.
T.D. (cr.) 6,040 ft.; R.U. rotary.

GREER COUNTY

M. C. Ent and R. C. Camp's No. 1 Simington, SW SE Sec. 29-5-21w.
Location.

Morgan et al's No. 1 Carder, C SW SE Sec. 19-4-22w.
T.D. 1,012 ft.; S.D. for fuel.

HUGHES COUNTY

Amerada Pet. Corp.'s No. 1-A Adams, NE NE SW Sec. 21-9-9.
First Wilcox 4,271 ft.; second Wilcox 4,307-17 ft.; T.D.; H.F.W. from both sands; S.D.

Dandridge & Crane's No. 1 Mead, NW NW NE Sec. 17-5-9.
S.D. 1,300 ft.

Freeman et al's No. 1 Kite, NW NW NE Sec. 8-6-10.
Set 5-in. csg. 598 ft.

KAY COUNTY

Harris & Haun's No. 1 Schuessler, C NW SW Sec. 3-28-2.
Oswego 3,150 ft.; drlg. 3,220 ft.

Bay Oil Co.'s No. 1 Holden, SW SW SE Sec. 14-28-3.
5-in. 2,945 ft.; drlg. plugs.

J. T. Lindsay's No. 1 Waggoner, NW NW NE Sec. 3-27-1.
Location.

KIOWA COUNTY

Henson & Patton's No. 1 Beeler, NE cor. Sec. 11-6-15w.
Drlg. 445 ft.

LINCOLN COUNTY

Carter Oil Co. et al's No. 1 McFarland C-38, SW SW NE Sec. 18-13-4.
Drlg. 2,600 ft.

Chester L. Carlock's No. 1 Young, C N½ NW NW Sec. 23-15-5.
Rig.

Mid-Continent Pet. Corp. et al's No. 1 Nunn, SE SE NW Sec. 35-15-1.
Location.

Slick-Urschel, Inc.'s No. 1 Miller, NW NW SE Sec. 25-15-3.
Tonkawa sand 3,995 ft.; drlg. 4,870 ft.

LOGAN COUNTY

Anderson-Kerr et al's No. 1 Renfrow, NE cor. Sec. 33-16-4w.
Drlg. 1,740 ft.

Sinclair Prairie and Slick-Urschel's No. 1 Koatsch, SW cor. Sec. 23-15-3w.
9-in. csg. cmtd. at 5,227 ft.; Chattanooga 5,910 ft.; Hunton 5,955 ft.; Sylvan 5,995 ft.; Viola 6,085 ft.; dense 6,115 ft.; T.D. 6,168 ft.; to core.

Sinclair Prairie Oil Co. et al's No. 1 School Land, SE cor. Sec. 36-17-1w.
Simpson dense 5,255 ft.; flowed 298 bbls. in 24 hrs.; top sand at5,285-90 ft., T.D.; H.F.W.; P.B. with 6 sacks of cmt. and lead wool.

Slick-Urschel et al's No. 1 Pennington, C SW NE Sec. 10-16-1w.
Hunton lime (cor.) 5,288 ft.; Sylvan 5,395 ft.; Viola 5,467 ft.; gas show; coring 5,517 ft. in dense lime.

J. C. Schaffer et al's No. 1 Hammond, SE SE SW Sec. 10-15-4w.
Drlg. 5,072 ft.

McCLAIN COUNTY

C. W. James et al's No. 1 Neal, C NW SE SW Sec. 4-5-2.
Hunton 3,335-37 ft.; running 8-in. csg.

NOBLE COUNTY

Marathon Oil Co.'s No. 1 Gilbert, NE cor. Sec. 24-22-2.
Wilcox sand 4,449 ft.; T.D. 4,480 ft.; flowed 1,793 bbls. in 7 days; may deepen.

Stanolind-Amerada et al's No. 1 Fuller, C SE SW Sec. 34-20-2w.
Viola 4,935 ft.; T.D. 4,960 ft.; R.U. cable tools.

OKFUSKEE COUNTY

Amerada Pet. Corp.'s No. 1 Jaynes, NW NW SW Sec. 20-10-10.
Hunton 3,690 ft.; 10,000,000 ft. of gas at 3,704 ft.; Wilcox sand 3,932 ft.; T.D. 3,988 ft.; 2 bailers wtr. per hr.

Mid-Continent Pet. Corp.'s No. 1 Haney, SW SE NE Sec. 24-12-8.
Acidized Wilcox sand 4,125-34 ft.; gas broke in; spraying oil; P.B. to 4,134 ft. and comp. for 15,500,000 ft. of gas.

OKLAHOMA COUNTY

W. H. Atkinson et al's No. 1 Reed, NE cor. Sec. 4-12-3w.
Drlg. below 4,300 ft.

Anderson & Kerr et al's No. 1 Linn, SW NW Sec. 17-14-2w.
Checkerboard 4,970 ft.; drlg. 5,403 ft.

Gypsy Oil Co.'s No. 1 Shock, NW SW SW Sec. 2-14-3w.
Drlg. 1,258 ft.

R. Carl Larkin's No. 1 Brobine, NW NW NE Sec. 33-13-5w.
Rig and pits.

OSAGE COUNTY

Peters Pet. Co. and Norbla Oil Co.'s No. 1, SW cor. Sec. 15-25-5.
S.D. at 3,134 ft.

PAYNE COUNTY

Marathon Oil Co.'s No. 1 Potts, C SW SW Sec. 27-19-2.
Top Arbuckle 5,085 ft.; T.D. 5,116 ft.; P.B. to 4,550 ft.; set 6-in. 4,489 ft.; drilled plug and got wtr.; P.B. to 4,510 ft.; H.F.W.

(Continued on Next Page)

In the Bandwheel Pool of Osage County, Continental Oil Co. and Sinclair Prairie Oil & Gas Co. had completed their No. 9, SE cor. Section 5-23-9, in the Mississippi lime logged from 2,118-57 feet, total depth, which pumped 75 bbls. of oil natural with no water.

The Finance Oil Co.'s No. 27, NE SE NW SW Section 19-23-9, Manion Pool, in Osage County, was the second well in this spot to produce from the Siliceous lime, and No. 1 well of the Finance Oil Co. being the discovery of this deeper pay zone for the pool. No. 27 found the lime pay from 2,493-96 feet, total depth, good for an estimated 1,200 bbls. per day and it was completed.

There were three completed oil wells in the Naval Reserve Pool of Osage County during the past week. Lewis Production Co.'s No. 3, NW SW SW Section 10-24-7, was completed in Bartlesville sand logged from 2,477-2,545 feet, total depth, flowing and swabbing after being shot with 80 quarts of nitroglycerin, an estimated 331 bbls. of oil for its initial 24 hours' production.

Continental Oil Co. and Gypsy Oil Co.'s No. 9 Farrell, SE SW NE Section 21-24-7, which made 123 bbls. of oil in 24 hours in Bartlesville sand at 2,643-2,714 feet, total depth, was shot with 110 quarts of nitroglycerin and it flowed 268 bbls. the first 16½ hours.

Skelly Oil Co.'s No. 5, SW SE NW Section 28-24-7, Naval Reserve Pool of Osage County, found Bartlesville sand at 2,552-2,655 feet, total depth, good for 325 bbls. on its initial gauge.

In the Atlantic Pool of Osage County, the Texas Co. and Sinclair Prairie Oil & Gas Co.'s No. 11, SE SW NW Section 30-25-8, swabbed 80 bbls. of oil naturally from Burgess sand logged at 2,394-2,431 feet, total depth, getting first oil at 2,415 feet. It was completed.

Alexander and others' No. 2-A, NW SW SW Section 36-25-11, Osage County, had shot sand 1,604-57 feet, total depth, with 100 quarts of nitroglycerin and it was completed for 35 bbls. daily on the swab.

North Central Fields

Stanolind Oil & Gas Co. and others' No. 2 DeBord-"B," NE NW SW Section 27-22-2w, Polo Pool in Noble County, was completed during the week, rated on its potential test as a 1,871-bbl. oil well with an estimated 2,000,000 feet of gas. Production came from the Wilcox sand at 4,840-93 feet, total depth.

In the Lucien Pool of Noble County, Stanolind Oil & Gas Co. and Amerada Petroleum Corp.'s No. 1 Frederick, C SW SE Section 28-20-2w, was completed in Wilcox sand logged from 5,085-5,142 feet, total depth, producing by flowing and swabbing on a six-hour potential production test, 200 bbls.

Logan County

An encouraging note was sounded for possible future development of the second Wilcox sand in the Crescent Pool of Logan County when the Texas Co.'s No. 3 Denny, NE SE Section 33-17-4w, was deepened to that horizon, same being recorded from 6,250-70 feet, total depth in sand, and flowed 1,710 bbls. of oil, cutting 6 per cent b.s. and water. It was completed at that depth.

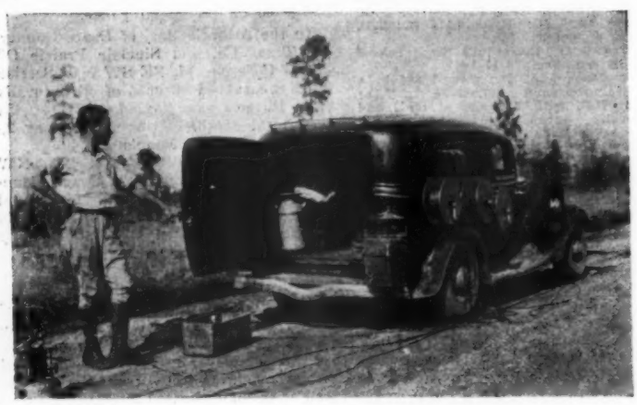
In the same pool, Gypsy Oil Co. and Carter Oil Co.'s No. 3 Knowles, SW NW Section 34-17-4w, was completed in Wilcox sand at 6,177-6,220 feet, total depth, its rated potential gauge being 1,208 bbls. for 24 hours.

Favorable reports on the wildcat test

Fitts Field
And
Coal County
Oil

Leases
Royalties
Production
Drilling Blocks
Appraisals

Charles J. Hagerling
Aldridge Hotel
Ada, Oklahoma
or
719-721 Petroleum Bldg.
Oklahoma City



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HOUSTON TEXAS

about 12 miles south of Guthrie in Logan County, Sinclair Prairie Oil & Gas Co. and others' No. 1 Koetsch, SW cor. Section 23-15-3w, had stimulated royalty trading in the area, as the test was reported running high on the Simpson dolomite formation which was topped and cored from 6,190-6,204 feet, at which depth the operators were trying to regain lost circulation.

Oklahoma County

Marathon Oil Co.'s No. 3 Dahl, NW SE Section 31-13-3w, was the sixth producer in the Edmond Pool of Oklahoma County, same flowing 2,794 bbls. with 12,000,000 feet of gas in nine hours from 75 feet of Wilcox sand at 6,695 feet, total depth. This is at the rate of 7,400

(Continued on Page 184)

Wildcat Operations in Oklahoma

(Continued from Preceding Page)

PITTSBURG COUNTY

McAllister Pet. Corp. et al's No. 1 Chunn. C SE NW Sec. 29-4-14.
T.D. 1,530 ft.; pipe collapsed; S.D.

P. H. Gray et al's No. 1 Lee, NW SE Sec. 12-5-12.
T.D. 1,210 ft.; fishing tools.

PONTOTOC COUNTY

Anderson & Kerr's No. 1 Newburn, NW SW NE Sec. 24-5-3.
Spudding.

E. M. Blanchard's No. 1 Crabtree, NE SE NE Sec. 27-3-6.
S.D. 2,920 ft.

Charles E. Carter's No. 1 Wood, NW SW SE Sec. 5-4-3.
S.D. 2,070 ft.

Crabtree's No. 1 Chandler, NE SE SW Sec. 4-5-6.
Drlg. 775 ft.

Crabb-Craw Oil Co.'s No. 1-A Breco, SE NE SW Sec. 3-4-6.
Sand 1,106-18 ft.; pumped 10 bbls. in 24 hrs.; S.D.

W. A. Delaney et al's No. 1 Fulsome, SE NE Sec. 35-4-6.
Location.

Fleetborn Oil Corp.'s No. 1 Oliver, NE NW SE Sec. 21-4-5.
12-in. csg. 105 ft.; W.O.C.S.

Mudge O. & G. Co.'s No. 1 Clampett, SW NW NW Sec. 10-2-6.
S.D. 915 ft.

Paramount Oil Co.'s No. 1 Graham, SW SE SW Sec. 12-1-7.
500 ft. wtr. in hole from second Bromide sand at 3,288-98 ft.; top lime 3,357 ft.; drlg. 3,400 ft. in lime.

Gillett & Kroeger's No. 1 Robbins, NE SE Sec. 31-1-4.
Machine.

Gillette & Kroeger's No. 1 Duver, NW SE Sec. 36-1n-6e.
Drlg. 1,247 ft.

Southern Oil Co.'s No. 1 Walker, NW NW SW Sec. 11-4-6.
Sand 785-816 ft.; 8,000,000 ft. of gas; T.D. 990 ft.; U.R.

POTTAWATOMIE COUNTY

Howard Sherman et al's No. 1 Wingo, NE NW SE Sec. 32-10-5.
3,210-20 ft.; show oil; drlg. 3,370 ft.

C. W. James et al's No. 1 Neal, C NW SE SW Sec. 4-5-3.
Wilcox 4,175-4,212 ft.; H.F.W.; P.B. to 3,340 ft.

SEMINOLE COUNTY

Ray Dorris and J. T. Hall's No. 1 Dorris. SE SE SW Sec. 31-10-7.
Sand 526-60 ft.; H.F.W.; S.D. 608 ft.

Crabtree Drlg. Co.'s No. 1 Chandler, NE SE SW Sec. 4-5-6.
S.D. 110 ft.

Verser & Clay et al's No. 1 Thomas, NE SE NW Sec. 1-6-6.
S.D. at 2,302 ft.

Wofford Drlg. Co. et al's No. 1 Abbott, NE cor. Sec. 33-8-7.
Rig only.

Wofford Drlg. Co. et al's No. 1 Thomas. NW SE Sec. 2-6-7.
Dolomite 3,890 ft.; T.D. 3,917 ft.; hole full oil; shut in for tanks.

TEXAS COUNTY (PANHANDLE)

Ben F. Ash et al's No. 1 Guymon Townsite, C NE SE Sec. 30-3n-15e; (Cimarron Meridian).
T.D. 2,420 ft.; fishing for drill pipe.

WASHITA COUNTY

Okla.-Midwestern Oil Co.'s No. 1 Deck, SW cor. Sec. 21-8-18w.
T.D. 2,420 ft.; lost tools in hole; rig rebuilt; S.D.

Anadarko Basin Oil Co.'s No. 1 Wolf, NE SW Sec. 23-9-17w.
Rigged up and S.D.

SOUTHERN OKLAHOMA

ATOKA COUNTY

Brookshire et al's No. 1 Rowland, NW NE NE Sec. 18-3-10.
H.F.W. 3,844 ft.; P.B. 757 ft.; treated with acid; C.O.

Clark et al's No. 1 Morrison, SE cor. Sec. 32-1-14.
S.D. at 80 ft.

Malernee et al's No. 1 D. O. K. Land Co. C SE SE Sec. 36-3s-13.
S.D. 2,115 ft.

BRYAN COUNTY

C. B. Welch's No. 1 Collins, NE NE Sec. 19-8s-3e.
Drlg. 492 ft.

Trio Oil Co.'s No. 1 Gibert, SW NE SW Sec. 25-8s-7.
Drlg. 240 ft.

CARTER COUNTY

Waco Turner's No. 1 Munson, NE NW NE Sec. 35-5s-2w.
12-in. csg. 185 ft.; S.D.

Carter Oil Co.'s No. 1 Carter-Williams, SW NE SW Sec. 27-2s-3w (7,000-ft. test).
Drlg. shale 4,505 ft.

COMANCHE COUNTY

H. W. Baker's No. 1 Miller, SE SW SE NE Sec. 22-3-13w.
S.D. 120 ft.

Oscar Jones' No. 1-A Sheets, NE SW Sec. 26-3-10w.
Machine.

Henry Rosenthal et al's No. 1 Au-che-re-ah, NW NW NW Sec. 5-1n-9w.
Sand 1,479-93 ft.; hole full oil and wtr.; to deepen.

F. F. Stevens' No. 1 Green, SE SW Sec. 2-1-13w.
Drlg. 1,455 ft.

Heiden & Taylor's No. 2 Crutcher, C NE Sec. 11-1n-12w.
S.D. at 860 ft.

HARMON COUNTY

Jud Leath et al's No. 1 McConnell, NW cor. Sec. 22-3-24w.
Rigged up and S.D.

Wilson & Walker's No. 1 Wilhelm, SE cor. Sec. 30-4-24w.
Spud and S.D.

GREER COUNTY

D. E. Whatley et al's No. 1 Hamilton, NW SE Sec. 25-4-24w.
Cellar.

JACKSON COUNTY

Associated Oil Co.'s No. 1 Harrell, NE SW Sec. 13-1-21w.
T.D. (cor.) 1,125 ft.; S.D.

J. G. Buel et al's No. 1 Kizziar, SE SE NE Sec. 2-2n-22w.
Drlg. 890 ft.

Burke-Greis Oil Co.'s No. 1 Millbrant, SW NW SW Sec. 31-3-19w.
Location.

Burk Royalty Co.'s No. 1 Gore, SE NW SW Sec. 3-1s-20w.
S.D. at 1,909 ft.

A. H. Emenheiser's No. 1 Morrell, SE SW SE Sec. 17-3n-21w.
S.D. 910 ft.

Golden & Cochran's No. 1 Duncan, NE cor. Sec. 34-2n-21w.
T.D. 1,620 ft.; shale; fishing 8-in. csg.

Gypsy Oil Co.'s No. 1 Boucher, NW SW SW Sec. 32-1-19w.
Drlg. 115 ft.

Gypsy Oil Co.'s No. 1 Stokes, SE NW SW Sec. 11-1-20w.
Lime 1,709-11 ft.; T.D. 1,722 ft.; S.D.

Jack Kilgore's No. 1 Woolridge, SW SW NE Sec. 15-3n-21w.
Drlg. 1,300 ft.

Loper et al's No. 1 Conrad, NE cor. Sec. 35-1s-19w.
Drlg. 840 ft.

Palo Duro Oil Co.'s No. 1 Ealum, SW SW SE Sec. 16-2-21w.
T.D. 840 ft.; S.D. for power unit.

Selby Oil Co.'s No. 1 Hold, SE SW Sec. 15-2-20w.
Granite wash 1,740-65 ft.; dry; S.D. 1,805 ft.; T.D.

Dick Scheig et al's No. 1 Cole, NE SE SE Sec. 5-1n-20w.
Granite wash 1,295-1,311 ft.; gas; 1,336-70 ft. dry; drlg. 1,489 ft.

Triangle Oil Co.'s No. 1 Fox, C E½ W½ NW Sec. 11-3n-20w.
Drlg. 400 ft.

Whatley & Whatley's No. 1 Holt, NW SW SE Sec. 20-1n-20w.
Drlg. shale 1,247 ft.

JEFFERSON COUNTY

Gypsy Oil Co.'s No. 1 James, SW SE SE Sec. 30-4s-6w.
Drlg. 160 ft.

JOHNSTON COUNTY

W. A. Delaney et al's No. 1 Diamond, NW NE SE Sec. 5-1s-8.
Drlg. 2,100 ft.

LOVE COUNTY

Amerada and Stanolind's No. 1 W. & D. NW SE SE Sec. 27-6s-2e.
T.D. 1,873 ft.; crooked hole; may skid rig for new hole.

MARSHALL COUNTY

Paul Robb's No. 1 Vittetoe, C NE SE Sec. 11-5s-4e.
Drlg. lime 5,295 ft.

McCURTAIN COUNTY

J. V. Scrivener et al's No. 1, NE SW SW Sec. 24-6s-21.
Machine.

MURRAY COUNTY

Equitable O. & G. Co.'s No. 1 Baer, SW NW NW Sec. 21-1s-3e.
Drlg. 485 ft.

Equitable O. & G. Co.'s No. 1 Ferguson. NE NE SW Sec. 36-1s-3.
Rig.

Equitable O. & G. Co.'s No. 1 Scott, CSL N½ NW SW Sec. 15-1s-3.
S.D. 1,500 ft.; H.F.W.

Manahan et al's No. 1 Ward, NE SE NW Sec. 18-1s-3; (Wilcox sand test).
Top Bromide 1,166 ft.; sand 1,311-76 ft.; S.O. in top and wtr. in base; 1,545-51 ft.; H.F.W.; U.R. 8-in. csg.

C. P. Williams et al's No. 1 Singleterry, SE SW NW Sec. 25-2s-3e.
T.D. 743 ft.; S.D.

STEPHENS COUNTY

Wm. Angle et al's No. 1 Cooper, NE NW NW Sec. 23-2-7w.
Drlg. 350 ft.

J. W. Madison's No. 1 Tussey, SW SE NW Sec. 24-1n-4w.
Rig down, drill pipe in hole; T.D. 2,220 ft.

TILLMAN COUNTY

Cockburn & Boose's No. 1 Nichols, SE cor. Sec. 28-2s-19w.
Location.

Two New Oriskany Sand Tests Scheduled in Kanawha County, West Virginia

By STAFF CORRESPONDENT

PITTSBURGH, Pa., Apr. 1.—Three additional tests, which are scheduled for the Oriskany sand, will be made in Kanawha County, West Virginia, in Loudin district, about 6 miles southwest by south. Godfrey L. Cabot, Inc., has part of the material on the ground on the Edgewood Realty Co. tract. In Malden district, the same operator also has the material on the ground for a test on the Plus R. Levi farm. In Cabin Creek district, this operator is drilling the No. 52 on the Arabella D. Huntington lease down to the deeper sands. Generally these wells are completed in the Injun or the Weir sands. The depth of the No. 52 is now 4,070 feet. This test is on the eastern flank of the Chestnut Ridge anticline whereas the other tests recently drilled are all located on the western flank.

The status of the other Oriskany sand tests drilling follow: the Clyde Oil & Gas Co. is shut down cementing a cave at a depth of 4,325 feet on the F. W. Shinn (Mary A. McGraw) farm in Elk district; the Yoak Oil & Gas Co. remains shut down at 2,335 feet for boiler repairs. Benedum & Trees are drilling at 3,263 feet in the test on the Mary C. Wingfield farm. In Jefferson district, these operators have the tools stuck in the hole on the Joseph Hill farm at a depth of 1,435 feet. In Elk district, Grosscup and others have abandoned the location for a test on the J. M. Ramsey heirs farm.

Thirteen completions and one dry hole were reported from the lower eastern fields during the past week. Ten were gas wells and three were small producers with an initial production of only 7 bbls. a day.

SOUTHEAST OHIO

In Southeast Ohio there were two gas wells, one showing some oil, two producers and one dry hole during the week. In Ashland County, in the southeast quarter of Section 10, Lake Township, Stewart and Bradfield drilled a test on the Clyde Eberhard farm through the Berea sand to a depth of 620 feet. It was a dry hole.

In Guernsey County, Frank Lyons and others completed a test on the Gilbert W. Rich farm in Section 18, Richland Township, in the Berea grit at a depth of 1,345 feet. It is a gas well with a volume of about 253,000 feet a day along with a showing of 4 or 5 bbls. a day. It is located about a half mile north of the old Senecaville gas pool. The well is shut in for the present.

In Holmes County the Ohio Fuel Gas Co. completed a test on the Adeline McKinley farm in Washington Township, Lot 27, in the Clinton sand at a depth of 2,850 feet. It is a gas well showing for 150,000 feet a day.

In Noble County, in the northwest quarter of Section 18, Seneca Township, Thurman L. and C. W. Rich completed a second test on the Grace Gray farm in the Berea grit at a depth of 1,334 feet. It made a very light showing of oil and a small volume of gas, natural, but is showing for about a barrel pumper after shot. It is located about 900 feet due north of the No. 1 same farm.

In Washington County, the southwest quarter of Section 22, Aurelius Township, D. R. Greenlees and others completed a test on the James Dow farm in the Berea grit at a depth of 1,670 feet. It produced a half barrel the first day, natural, which increased to 4 bbls. a day after shot. The sand was broken and not regular.

In Columbiana County the test of the Union Gasoline & Oil Corp. on the William Jenkins farm, in the southeast quarter of Section 36, Madison Township, is drilling at a depth below 4,000 feet. It is exploring the deeper sands and is located about a mile from Glascow on the Glascow anticline. The elevation of the mouth of the well is 1,327 feet.

SOUTHWEST PENNSYLVANIA

One completion was recorded in Southwest Pennsylvania during the past week. In East Findley Township, Washington County, the Natural Gas Co. of West Virginia completed a test on the P. I. Ealy farm in the Injun sand as a gas well showing 500,000 feet a day, initial. It is located about a mile north of the J. N. Clutter No. 1.

In Amwell Township, Washington County, the Carnegie Natural Gas Co. drilled the No. 2 on the M. Manon farm slightly deeper to a total depth of 2,977 feet. The first oil show was at 2,954 feet and the second pay was reached at 2,968 feet. After an eight-quart shot, it appears good for 5 to 8 bbls. a day.

In this township, completing the earlier report of last week, the Union Gasoline & Oil Corp. test on the Ella S. and A. L. Johns farm stopped at a depth of 2,728 feet with the top of the Gantz sand showing at 2,718 feet and 3,600,000 feet of gas a day showing at 2,728 feet.

On the R. M. Carrons farm in this township, the Carnegie Natural Gas Co. drilled deeper to a total depth of 3,118 feet, through the Fifth sand without striking additional oil or gas. It is being plugged back to the Thirty-Foot sand at 2,916 feet which has a gas volume now of about 134,000 feet a day.

In North Franklin Township, Washington County, E. H. and J. B. Tague are drilling the No. 13 on the Adaline D. McKennan estate at 889 feet. The Little Dunkard sand was at 826-869 feet with about 1 bbl. of oil a day showing at 854 feet.

In West Bethlehem Township, Washington County, Furman Nuss & Co. are testing the No. 1 on the Margaret Keys farm at a depth of 2,320 feet. In this township the Carnegie Natural Gas Co. is plugging the No. 1 on the Ella Ross farm about 3 miles southeast of Carmichaels.

In North Strabane Township, Washingotn County, the Duquesne Gas Co. is drilling a test on the McCoy farm which has reached a depth of 935 feet. The Pittsburgh Coal was at 730 feet. In South Franklin Township, this company has a rig up for a test on the S. A. Dague farm.

In Greene County the Equitable Gas Co. is plugging the No. 1 on the Ingram Cummins farm in Franklin Township. In Sphinghill Township this company is plugging the No. 1 on the James M. Farrell farm. In Richhill Township, Lewis & Co. are fishing the tools at 1,100 feet in the test on the Samuel Chess farm.

In Fayette County, South Union Township, the test of William Snee and others on the Summit Hotel property has passed the 300-foot level, and is actively drilling. The rig is located a short distance south of the road on the west flank of Chestnut Ridge anticline and is easily visible from the road. Lower down the slope of the mountain, the Berea and Big Lime and Injun sand outcrops.

WEST VIRGINIA

One small producer and seven gas wells were reported from West Virginia during the week. In Ritchie County, just northwest of the tip of Lost Run Pool in Clay district, Rinehart and others completed a test on the A. J. Glass farm in the Injun sand at a depth of 2,131 feet. It is showing for 2 bbls. a day.

In Grant district, Ritchie County, on the waters of Elm Run, Deems and others have started drilling deeper the abandoned No. 2 on the Clark heirs farm.

Gas Wells

In Calhoun County, Ivy Gainer and others completed a test on the Ivy Gainer farm in Center district in the Salt sand at a depth of 1,506 feet. It is a fair gas well showing for 760,000 feet a day, initial.

In Kanawha County there were several gas wells. In Cabin Creek district the Ten Mile Oil & Gas Co. completed three wells on the H. C. Dickinson farm. The No. 15 was completed in the Salt sand at 1,473 feet and has a volume of 212,000 feet a day. No. 16 is larger and has a volume of 924,000 feet a day from the same formation at a depth of 1,276 feet. No. 17 was drilled in the Salt sand at 1,369 feet and shows a volume of 160,000 feet a day.

In the same district, Godfrey L. Cabot, Inc., completed No. 51 on the A. D. Huntington lease in the Big Lime and Big Injun sands, total depth 2,401 feet, and it is also a gas well with a volume of 576,000 feet a day.

In Big Sandy district, same county, on the waters of Falling Rock Creek, J. B. Weir completed No. 108 on the Falling Rock Cannel Coal Co. tract in the Weir sand and it is a gas well showing 150,000 feet a day.

In Marion County, Monroe & Laughlin completed No. 3 on the A. D. Wells farm in Mannington district in the Bayard sand at a total depth of 3,615 feet. It is a small gas well with a volume of 149,000 feet a day.

Drilling in West Virginia

In Boone County the Boone County Coal Co. started drilling a second test on their own property in Washington district. At 270 feet they were fishing for the bit. In Sherman district, the Pure Oil Co. is grading a road to a location for No. 73 on the Federal Coal Co. tract.

In Cabell County no new locations have been reported. In Calhoun County the same prevails. In Sherman district, Dudley Lutz and others are down 1,060 feet in a test on the Elias Yoak farm. C. B. Lewis is still fishing the tools in the test on the M. J. Kight farm and at 980 feet.

In Clay County, F. F. McIntosh has reached a depth of 1,338 feet in the No. 2 on the Peabody Coal Co. tract in Pleasant district. In Gilmer County the Steer Creek Oil & Gas Co. is drilling at 1,635 feet in the No. 8 on the C. D. Mollahan farm in Center district.

In Hancock County, the R. J. Braden Co. is drilling a test on the George Phillips farm in Grant district and has reached 450 feet. In Kanawha County the Ten Mile Oil & Gas Co. is drilling No. 18 on the H. C. Dickinson lease in Cabin Creek district.

In Lincoln County W. C. Kingery and others have started drilling a test on the Millard Pratt heirs farm in Sheridan district. In Logan County the West Vir-

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ginia Gas Co. has reached 2,200 feet in No. 38 on the Dingess Run Coal Co. in Logan district. In Chapmansville district Cumberland Petroleum Co. is down 400 feet in No. 10 on the Merrill Coal Co. tract.

In Marshall County Samuel Morrison and others have spuddtd in and started drilling the test on the Ambrose Ferris farm in Clay district. McIntire and others shut down at 1,362 feet in the test on the J. W. Henry heirs farm in Franklin district.

No new locations are reported in Ritchie County. In Clay district, Cottrill and others are fishing at 500 feet in the test on the Emma Wince farm. Smith & Hendershot are drilling at 800 feet in No. 4 on the Charles Wilcox, Sr., farm. McCall Drilling Co. is testing No. 1 on the Elizabeth Pyles farm at a depth of 1,760 feet. In Murphy district the Southern Oil Co. is down 1,500 feet in No. 14 on the Alvin Wince farm. C. S. Morris is down 1,250 feet on the H. B. Ayers farm, a test. W. R. Hays has reached 1,800 feet in No. 4 on the Levi Wilson farm. In Grant district, Joseph Elder is drilling at 1,817 feet in the test on the Isaac M. Jackson farm. Ralph Jackson is down 900 feet in a test on the S. and L. Tennat farm. In Union district, Jobe & Prunty are drilling a second test on the R. G. Davis and others lease and have reached 725 feet.

In Roane County, D. W. Law and others have a location for a test on the J. D. Lyons farm, Curtis district. In the same district, three other locations have been made. Reedy Oil & Gas Co. has located No. 7 on the L. M. Riddle farm. McIntosh & Norman have a location for a test on their own property in fee. J. Cottle and others have a location for a test on the W. A. Davis farm. Clyde Campbell has part of the material on the ground for a test on the Marcellus Hart farm. In Smithfield district, the Big Four Drilling Co. is drilling at 1,792 feet in the test on the Frank Wallbrown farm.

Michigan Fields

(Continued from Page 165)

Township, Midland County: Joseph Trever's No. 2 Mrs. F. Forbes, SE SW SW Section 22-13n-1w, and McClanahan Oil Co.'s No. 2 Howard Northrup, C N half NE SW Section 20. The third was for Melling Oil & Gas Co.'s No. 2 State of Michigan, SE SE NW Section 6-21n-3e, Mills Township, Ogemaw County.

Considerable new activity is anticipated in northern Broomfield and southern Sherman Townships, Isabella County, where the Michigan Public Utilities Commission approved a request of the Michigan Cities Natural Gas Co. to extend its lines as a common purchaser.

Deep River Prospecting Co., of Midland, started last week to move in a rig on a wildcat location near the village of Standish.

Administrator's Report on Crude Oil Stocks

WASHINGTON, D. C., Apr. 1.—Stocks of domestic and foreign crude petroleum at the close of the week ended March 23 totaled 322,556,000 bbls., according to data compiled by the Bureau of Mines, Department of the Interior, for Petroleum Administrator Harold L. Ickes. In comparison with data for the previous week, this total represents a net increase of 380,000 bbls., comprising a decline of 5,000 bbls. in stocks of domestic crude oil and an increase of 385,000 bbls. in foreign crude stocks.

Current reports of the industry indicate that crude oil production showed a small decrease, the daily average for the week ended March 23 being 2,640,000 bbls. as compared with an average of 2,655,000 bbls. for the previous week. Small increases in production in Oklahoma, Kansas and Texas were more than compensated by a decline in California. Imports increased materially, the daily average being 93,000 bbls., as compared with 64,000 bbls. for the previous week. Daily average crude runs to stills declined from 2,540,000 to 2,520,000 bbls. The estimated daily average balance of crude oil for the week ended March 23 was as follows (barrels): Production, 2,640,000; imports, 93,000, equals runs to stills, 2,520,000; increase in stocks, 54,000; exports, fuel and losses, 159,000.

STOCKS OF CRUDE PETROLEUM, MARCH 16 AND 23, 1935

(Barrels of 42 gallons)

Grade of crude oil—	Mar. 16	Mar. 23
Pennsylvania Grade ..	4,371,000	4,411,000
Other Appalachian ...	938,000	948,000
Lime-N.E. Indiana-Michigan	1,165,000	1,173,000
Illinois-S.W. Indiana .	11,485,000	11,377,000
N. Louisiana and Arkansas	9,751,000	9,942,000
West Texas and S.E. New Mexico	30,434,000	30,547,000
East Texas	29,786,000	29,735,000
Other Mid-Continent .	147,818,000	148,443,000
Gulf Coast	20,289,000	20,012,000
Rocky Mountain	27,651,000	27,633,000
California	34,892,000	34,354,000
Domestic crude	318,580,000	318,575,000
Foreign crude	3,596,000	3,981,000
Total*	322,176,000	322,556,000

*Represents approximately 98 per cent of total stocks in the United States, exclusive of producers' stocks.

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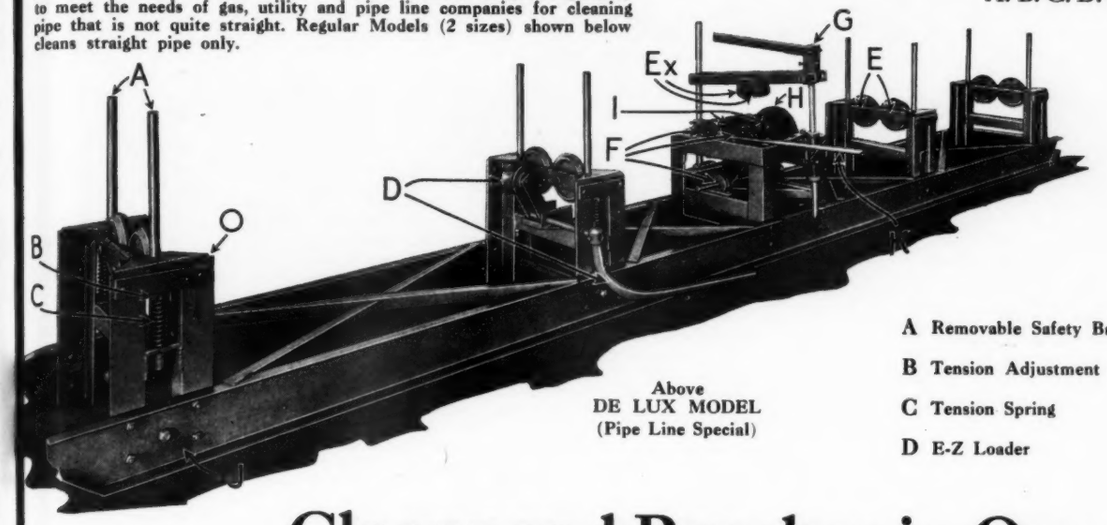

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- **F** Ball Bearings
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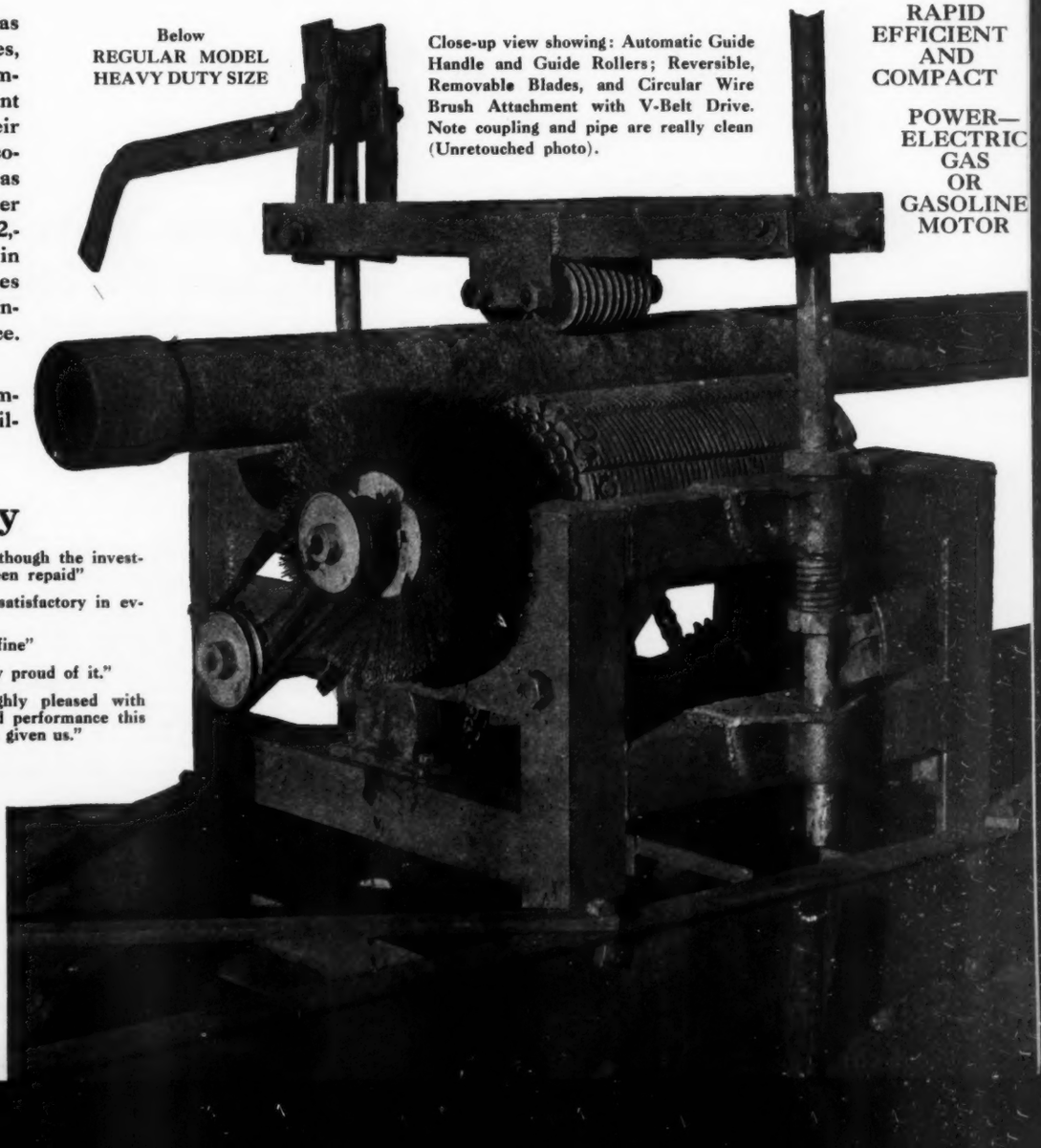

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Amerada Completion in Monument, Lea County; Resumption of Operations in Montana Fields

By TOLBERT R. INGRAM
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., Apr. 1.—Amerada Petroleum Corp.'s No. 1-D State, C NW NW Section 1-20-36, the discovery well in the Monument area, 10 miles north of the Eunice Pool, Lea County, New Mexico, responded favorably to acid treatment and flowed 1,801 bbls. in 12 hours and 20 minutes, or at the rate of 3,600 bbls. daily, after being acidized with 2,000 gallons. The gas was estimated at 3,000,000 feet a day. It was shut in for pipe connection. Total depth was 3,954 feet and it was plugged back to 3,946 feet to shut off water. The test was made through 3-inch.

Eunice Area

Peerless Oil & Gas Co.'s No. 1 State, C NW SW Section 29-21-36, near the southern edge of the pool, was completed as a pumper and made 65 bbls. first 24 hours with 1½ to 3 per cent water after being treated with 4,000 gallons. Total depth is 3,974 feet and the pay was at 3,875-3,971 feet. Elevation is 3,625 feet.

Continental Oil Co.'s No. 30-A-1 Lockhart, C SE NE Section 30-21-36, is still testing at 3,957 feet, total depth. Last reported it flowed 100 bbls. of oil plus 8 per cent water. Same company's No. 20-C-4 State, C SE SW Section 20-21-36, is rigging up rotary, and its No. 20-C-5 State, C SW SW Section 20-21-36, began spudding March 15, set 10¾-inch at 132 feet with 75 sacks, and is drilling at 739 feet in red beds. Continental's No. 9-B-2 Meyers, C SE NW Section 9-21-36, is drilling at 3,100 feet in anhydrite, and its No. 20-C-3 State, C SE NW Section 20-21-36, is drilling at 2,450 feet in salt and anhydrite. Same company's No. 8-B-2 Meyers, C NE NW Section 8-21-36, began spudding March 15, set 10¾-inch at 105 feet with 75 sacks and is drilling at 821 feet in red beds. Its No. 18-A-2 Meyers, C NW SE Section 18-21-36, cemented 7⅝-inch at 1,625 feet with 400 sacks and is drilling at 2,500 feet in salt and anhydrite.

Atlantic Oil Co.'s No. 1-C State, C SW SE Section 5-21-36, most northerly well in the pool, which will add one unit of 40 acres to the proven area, is a near completion at 3,894 feet, total depth. It topped the pay at 3,825 feet and is testing. Initial average flow was 30 bbls. an hour.

Humble Oil & Refining Co. has promise of a large well in No. 2-B State, C SE NW Section 29-21-36, which in a drill stem test at 3,850-3,914 feet, total depth, showed 3,380 feet of oil in seven minutes. It then cemented 7-inch at 3,760 feet with 500 sacks and is preparing to complete. Gypsy Oil Co.'s No. 4 Bell-Ramsey, C NW NW Section 9-21-36, is bottomed at 2,825 feet in anhydrite and waiting after cementing 7⅝-inch at 2,813 feet with 450 sacks. Skelly Oil Co.'s No. 2-B State, C SW NW Section 16-21-36, cemented 9⅝-inch at 1,665 feet with 500 sacks and is drilling at 2,700 feet in salt. Repollo Oil Co.'s No. 1 Adkins, NW cor. SE Section 9-21-36, which will extend the proven area one unit east, is testing at 3,900 feet, total depth. Through the tubing at 3,890 feet it made 1,250,000 feet of gas and 35 bbls. of oil in one hour. The 7⅝-inch is at 3,802 feet. Shell Petroleum Corp.'s No. 1-A State, C SE NE Section 12-21-35, has re-treated with 3,000 gallons of acid and is waiting. It plugged back from 4,404 feet to 3,987 feet and last week was reported swabbing 13 bbls. of oil and 120 bbls. of water in 16 hours. Tide Water Oil Co.'s No. 4 State-Foster, C NE NE Section 8-21-36, is drilling at 2,580 feet in anhydrite and salt.

Cooper Area

One completion and three locations were reported in the Cooper Pool, Texas Co.'s No. 4 Ogg, C NW NW Section 35-24-36, made 200 bbls. in one hour through the casing with 5,000,000 feet of gas at 3,486 feet, total depth. The pay was at 3,465-86 feet; elevation 3,303 feet. The 7-inch was cemented at 3,453 feet and the 2-inch was run to 3,486 feet.

Two of the locations are offsets to this well: Texas Co.'s No. 3-B Ogg, C NE NE Section 34-24-36, on the west, and Continental Oil Co.'s No. 26-A-1 Gates, C SW SW Section 26-24-36, on the north. The third location, an important test, is Amerada Petroleum Corp.'s No. 1 Isabel, C SE NE Section 15-24-36, half a mile north of Continental's No. 15-A-1 Vaughn, completed last week as a good well.

Phillips Petroleum Co.'s No. 13 Woolworth, C SW NW Section 26-24-36, is drilling at 2,190 feet in salt, and its No. 14 Woolworth, C NW SW Section 26-24-36, set 9⅝-inch at 1,370 feet with 350 sacks and is drilling at 1,787 feet in anhydrite and salt. Same company's No. 15 Woolworth, C SE NE Section 27-24-36, began spudding March 12, set 12½-inch at 1,300 feet with 150 sacks, and is waiting. Texas Co.'s No. 6 Ogg, C SW SE Section 35-24-36, is waiting at 1,730 feet, total depth, after cementing 9⅝-inch at 1,726 feet with 1,500 sacks, and its No. 1-B Ogg, C SE SE Section 34-24-36, is moving in materials. Same company's No. 2-B Ogg, C SE NE Section 34-24-36, is building rig. Simms Oil Co.'s No. 1 Woolworth, C SE NE Section 35-24-36, had more bad luck at 3,406 feet, total depth, when drill stem stuck while drilling by old drill stem. It was shot off at 2,970 feet and hole was plugged back to 2,600 feet. Continental Oil Co.'s No. 23-A-2 Gates, C NW NW Section 23-24-36, has rig up, and Humble Oil & Refining Co.'s No. 2 Coats, NW NE Section 10-24-36, cemented 6⅝-inch at 2,973 feet with 150 sacks and is drilling at 2,990 feet. This is a relief well for No. 1 Coats which had a gas blowout at 3,013 feet last fall, followed by fire. Empire Gas & Fuel Co.'s No. 2 Everetts, C SE SW Section 35-24-36, after plugging back from 3,490 to 3,450 feet, flowed 400 bbls. of fluid, 40 per cent water. The water increased and is believed to have broken through. It is drilling out plug and will recement. Its No. 3 Everett, C NW SW Section 35-24-36, is drilling at 2,990 feet in lime and salt. Stanolind Oil & Gas Co.'s No. 4-A Meyers, C NE SW Section 22-24-36, deepened last week to 3,620 feet after fighting water, ran 3-inch with packer at 3,575 feet and perforated above packer. It is testing and flowed 400 bbls. of fluid in one hour, of which 75 per cent was water.

Jal Area

Southern Petroleum Exploration Co.'s No. 1-B Ascarate, C NE SW Section 24-25-36, is drilling at 2,519 feet in anhydrite. Hammond, Inc.'s No. 1 Sholes, SE cor. NW Section 13-25-36, is drilling at 1,780 feet in salt and anhydrite, and its No. 2 Sholes, NE cor. NW Section 13-25-36, is drilling at 1,000 feet in red beds. R. H. Henderson and others' No. 1 Langley, C SE SE Section 8-25-37, is drilling at 2,375 feet in anhydrite, and Repollo Oil Co.'s No. 2 Gloyd, NW cor. SE Section 12-25-36, is testing at 3,325 feet and will be an early completion. The Texas Co.'s No. 1 Parker, C SW SW Section 29-26-37, is fishing for drill pipe at 2,794 feet. Trinity Drilling Co.'s No. 1 Sholes, C NE NE Section 24-25-36, is drilling at 3,036 feet in lime.

Hobbs Area

Noble and others' No. 1 Townsite, W NW SE Section 34-18-38, in the town of Hobbs, a slight extension east, is a near completion at 4,215 feet, total depth. The 7⅝-inch was cemented at 3,957 feet with 500 sacks and after drilling out plug tubing was run preliminary to acidizing. Same company's No. 3-C State, NE NW SW Section 24-18-37, is drilling at 3,906 feet in lime and anhydrite. Shell Petroleum Corp.'s No. 1 Turner, SW cor. NE Section 34-18-38, a north offset to the Townsite well, cemented 7⅝-inch on bottom at 1,675 feet with 250 sacks, and is waiting. The 12½-inch was set at 275 feet with 250 sacks. Same company's No. 2-D State, C NE NW Section 24-18-37, cemented 7-inch on bottom at 4,010 feet with 250 sacks and is waiting. Continental Oil Co.'s No. 3 Grimes, SW NW SE Section 28-18-38, has completed cellar and pits. National Securities Oil Co.'s No. 1 Oinam, NE SE SW Section 33-18-37, is shut down at 4,402 feet in lime.

Lea Area

The bad luck of the wildcatter in Township 20s, Range 32e, to the north and west of the Lea Pool, persisted this week when two wells were abandoned as failures. The first was Texas Co.'s No. 1 Moore, C NW SE Section 21-20-32, abandoned at 3,019 feet with a hole full of sulphur water at 2,980-90 feet; elevation 3,508 feet. It was on a promising seismograph high. The other failure was Argo Royalty Co.'s No. 1 Burner, SW NE NE Section 6-20-32, which had a hole full of sulphur water at 2,918-25 feet. These make six wildcats drilled in various parts of the township, of which five were abandoned this year.

Texas Co.'s No. 1 Cole, C NE NE Section 35-19-33, is standardizing at 1,515 feet after setting 8¼-inch at 1,507 feet with 75 sacks. It is bottomed in anhydrite. R. H. Henderson and others' No. 1 Russell-Steele, C NE NW Section 24-20-33, is straightreaming at 3,481 feet, total depth, to shut off salt water at 3,434-64 feet. Anderson & Pritchard's No. 1 Fisher, C SE NE Section 8-20-35, is drilling at 750 feet in red beds.

San Simion Area

Humble Oil & Refining Co.'s No. 1 Saunders, C NE NE Section 4-22-34, had a show of gas at 2,425 feet and is drilling at 3,125 feet in lime and anhydrite.

Nadine Area

Repollo Oil Co.'s No. 1 Arnold, SW NW SE Section 11-20-38, is drilling at 1,830 feet in salt. It topped anhydrite at 1,520 feet and salt at 1,631 feet; elevation is 3,567 feet. This wildcat is 6 miles south of the Hobbs Pool.

Maljamar Area

Maljamar Oil & Gas Co.'s No. 1 Miller, C NW SW Section 23-17-32, set 12½-inch at 790 feet and 10-inch at 956 feet and is drilling at 1,240 feet in salt.

Eddy County

Flynn, Welch & Yates have completed

Several Tests in the Turner Valley Field Are Now Nearing Interesting Stages

By VICTOR LAURISTON
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, Apr. 1.—In the Turner Valley Field, the Publix Oil & Gas Co.'s No. 1, LSD 8, Section 28-18-2w5, is below 5,355 feet and more than 455 feet in the Madison limestone with wet gas flow between 6,000,000 and 7,000,000 feet. Naphtha recovery was tested on the separator but it was decided to go deeper as the main porous horizon has not been reached. In the same section, British Dominion Oil & Development Corp.'s No. 4, LSD 6, is below 5,400 feet. Location is on the west side of the section, and considerably west of any previous producers. Farther south, Renfrew Royalties' No. 3, Morris & Goodfellow, LSD 3, same section, is standing at 4,410 feet and will likely await the outcome of the British Dominion test.

In the far south end of the field, Union-Freehold Oil Corp.'s No. 1, LSD 8, Section 21-18-2w5, is below 5,590 feet and expected to get the Madison limestone within a few days. Though a little deeper than tests farther north, it has logged closely with producers and is regarded as proving the structure for approximately a half mile southeast of the nearest producer, Highwood-Sarcee's No. 1.

In the North Turner Valley, Royalite Oil Co.'s No. 26, LSD 5, Section 23-20-3w5, got the Home sand at 4,230 feet and drilling below 4,377 feet. This is a high point for the Home sand in North Turner Valley. Model Oils' No. 1, approximately 800 feet northwest, got the same horizon at 5,058 feet, while Model's No. 1 Anaconda, a half mile farther north, got the Home at 4,939 feet and Foothills Oil & Gas Co.'s No. 1 at 4,680 feet. Model Oils, Ltd., has secured acreage in LSD 1 and 2, Section 22-18-2w5, protecting its No. 1 well to the immediate south, and in LSDs 11, 12 and 13, to the north and west.

Border Fields

On the Cardston structure, in the border area of southern Alberta, Franco Oils' No. 1, LSD 6, Section 5-3-25w4, is down 2,065 feet with 13⅜-inch hole. The light drilling outfit is being dismantled and a heavy duty outfit used by Parco Oils' No. 1 on the Twin River structure is being moved in for deeper drilling. Franco's No. 1 has encountered nine gas shows and two small oil shows. A subsidiary, Cardston Gas & Development Co., has a natural gas franchise for the town of Cardston.

On the Del Bonita structure, O. R. Lang has a tentative contract for a new test to spud this spring. Mr. Lang will also drill Vanalta's No. 7 in the Alberta end of the Red Coulee Field, with location in Section 19-1-21w4.

In the Skiff Field, Devenish Petroleum, Ltd., is cleaning out No. 3 producer, Section 27-5-14w4. Tubing has been pulled and cleaned and fuel oil

(Continued on Page 190)

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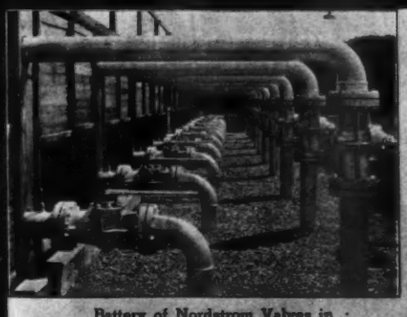
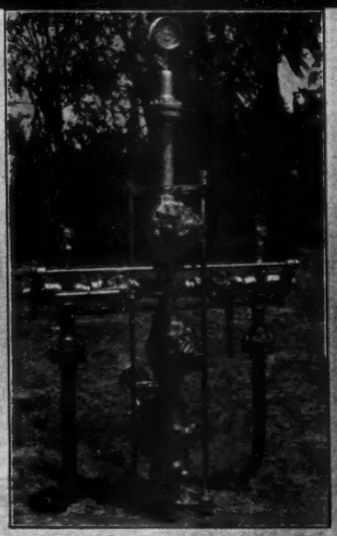
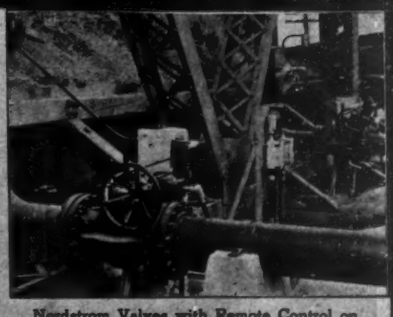


Battery of Nordstrom Valves in Mid-Continent Field





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Industrial Installation of EMCO Pressed Steel Meters and Nordstrom Valves

Tank Truck Delivery Using Pittsburgh Piston Meter

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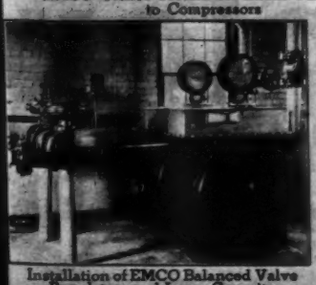
Nordstrom Valves on Flow Lines



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a good well southeast of the South Artesia Pool in No. 71 State, C SW NE Section 10-19-28, which made 312 bbls. the first 24 hours at a total depth of 2,124 feet. Oil was found at 1,985-2,003 feet, 5⅛-inch was cemented at 1,950 feet and 2-inch tubing was run to 1,995 feet. The pool is comparatively small and Flynn, Welch & Yates have done most of the developing. Other wells completed by this firm have run around 15 to 25 bbls. initial after being shot.

Neal Wills and others' No. 1 Levers, C NW NE Section 35-20-28, southwest of Getty Pool, was found to be running so low it was abandoned at 825 feet.

Getty Oil Co.'s No. 7 Dooley, SW cor. NW Section 24-20-29, a deep test of the Getty Pool, is waiting after cementing 13⅜-inch on bottom at 1,578 feet with 450 sacks. Premier Petroleum Co.'s No. 1-E Dexter, C NW NE Section 20-17-30, Maljamar area, began spudding March 18. At a meeting of stockholders last week C. C. Spicer, of Los Angeles, was elected president; J. W. Berry, of Artesia, vice president, and C. J. Dexter secretary and treasurer.

Roosevelt County

The Claudell Development Co.'s No. 1 Wilmes, C SW SE Section 21-2s-30, Pomeroy district, is shut down for orders at 3,655 feet and may recement 5⅛-inch, which was set at 3,613 feet. Test after the pipe was set showed water and it is believed a good shutoff was not obtained.

Santa Fe County

Elmer Fisher's No. 1 Hill, Section 6-10n-7e, Barton district, is drilling at 2,725 feet in hard gray lime.

San Miguel County

Cabra Springs Oil & Gas Co.'s No. 1 Thompson, SW NE NE Section 22-12n-22, Pino Mesa district, is bottomed at 3,865 feet and preparing to pull 6⅝-inch and underream 8¼-inch from 2,780 feet to bottom. Same company's No. 3, SW cor. Section 31-12-22, is shut down at 312 feet for 15½-inch pipe.

Valencia County

Ringle Development Co.'s No. 1 Fuqua, SW Section 13-5n-3e, Belen district, spudded to 100 feet and shut down. Same company's No. 1, C SE SE Section 36-6n-6e, Tome grant, is shut down at 400 feet, and No. 2, C NE SE Section 20-6n-6e, is rigged and shut down. These interests are reported to control 146,625 acres in this area comprising 42,625 acres in the Fuqua ranch, 48,000 acres in the Tome grant, and 56,000 acres adjoining these blocks.

Western Natural Resources Corp., Inc.'s No. 2 fee, SW cor. NE Section 5-6n-1e, San Clemente grant, cemented 6⅝-inch at 5,600 feet with 450 sacks and will run liner and test oil show at 5,983-6,001 feet.

State Land Sale

Frank Vesely, commissioner of public lands, will hold a monthly sale of oil and gas leases on state land at Santa Fe on April 10 when 25 tracts, mostly in Lea County, will be offered at auction.

COLORADO

Adams County

Riddle Petroleum Co.'s No. 1 Baxter, C SW Section 2-3s-66, Derby district, is rigging up.

Fremont County

Waterville Oil Co.'s No. 1 State, SE cor. NW Section 16-18-69, Phantom Canon district, north of Canon City, which spudded in 1929 to go to Pennsylvanian, has made no new hole for the past year. It is bottomed at 2,780 feet and underreaming the 5⅛-inch to that depth. Casing is now at 2,340 feet. When present depth was reached, it had a show of oil, but hole was caving badly and no test could be made. Since then efforts have been made to get the hole cased to bottom.

Moffat County

Stanolind Oil & Gas Co.'s No. 28-X Parkinson, NE SW SW Section 22-4n-92, Iles Dome, set 13⅜-inch conductor pipe at 117 feet and is drilling at 1,021 feet.

Park County

South Park Oil Co.'s No. 1 State, SE cor. SW Section 16-11-75, Hartsel district, lowered the 10-inch from 775 to 890 feet and secured a water shutoff and is drilling ahead at 1,250 feet.

Prowers County

Trojan Oil & Gas Co.'s No. 1 Lotus Oil, NW NE NE Section 15-23-46, Lamar district, is drilling at 5,054 feet in sandy lime and has just passed through 7 feet of green shale.

Geophysical Operations

Gulf Research & Development Corp. has established headquarters at Eads, in Kiowa County, for two parties which will conduct a survey in that general area, using an improved magnetometer. Indian Territory Illuminating Oil Co.'s No. 1 party is shooting south of Wray, in Yuma County, and No. 2 party is operating in Washington County between Akron and Flagler. Geophysical Service, Inc., has completed its work in central Elbert County and is moving to California.

WYOMING

The Elk Basin Field in Park County and the Grass Creek Field in Hot Springs

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County, are temporarily shut in on account of market conditions. Ohio Oil Co. and Stanolind Oil & Gas Co. operate the field.

Big Horn County

Ohio Oil Co.'s No. 1 Hoskins, SW cor. Section 14-56-97, Byron Dome, a recent completion, averaged 400 bbls. a day on the pump from the Tensleep at 5,214 feet, total depth. Peay Oil Co.'s No. 1 Denio, Tract 43-C, Section 15-55-97, in fault block to the south of the Byron production, is fishing at 3,200 feet, corrected total depth. It had a show of oil in a stray sand above the Frontier at 3,147-82 feet. Ohio Oil Co.'s No. 2 Sidon Canal, C SW SW Section 24-56-97, is building derrick. Taylor Oil Co.'s No. 1 Hoskins, SE SE Section 25-56-97, has fished out 1,400 feet of the 2,700 feet of drill stem in the hole. Total depth is 5,275 feet. California Exploration Co.'s No. 1 Government, C SW SW Section 4-54-94, Spence Dome, is bottomed at 616 feet and fishing for lost rope socket. Yale Oil Corp.'s No. 1 Blakesley, NE NW Section 28-49-91, Bonanza district, is drilling at 1,215 feet.

Carbon County

Ohio Oil Co.'s No. 1 Morris, C NW SE Section 6-20-77, Diamond Dome, is drilling at 7,297 feet and is still in the red beds. Same company's No. 1 Kyle, NE SE NE Section 26-21-79, Medicine Bow district, joint with California Co., is drilling at 5,057 feet in the Morrison shale with the Tensleep at 6,000 feet as the objective. Earl W. Reeder, Inc.'s No. 1 Whitford, SW SE SE Section 24-20-84, Overland Dome, has succeeded in swedging out 10-inch which collapsed 2,200 feet off bottom at 3,595 feet.

Converse County

E. B. Jones and others' No. 1 Jebel, C N half Section 17-32-69, which is drilling to the gas sand at 600 feet, is making hole at 150 feet, and its No. 1 State, SW cor. Section 16-32-69, the deep test, shut down after cementing the 20-inch at 145 feet. John Ackard's No. 1 Daniels, SW cor. SE Section 17-32-71, Brenning Basin, is drilling at 2,500 feet.

Fremont County

Mid-American Oil Co.'s No. 2 Government, C NE SW Section 14-28-92, Sheep Creek, which stood full of oil at 2,211 feet, plugged back to cement 6⅝-inch at 2,175 feet with 100 sacks.

Niobrara County

Ohio Oil Co.'s No. 2 Rohlf, near C NE SE Section 32-36-65, Lance Creek, the first test to the third bench of the Sundance, made 135 bbls. an hour on a drill stem test from the third bench at 3,843-3,901 feet and then cemented 7⅝-inch at 3,845 feet. It is drilling out plug and will be an early completion. The first bench of the Sundance was proven in two wells drilled several years ago by the Ohio company. Same company's No. 6 Lamb, near C SE SE Section 32-36-35, is building derrick to go to the Sundance. Its No. 2 Lamb, NE NW NE Section 5-35-65, an old well to be deepened from the Muddy at 2,952 feet, total depth, will not start drilling for two or three months. Continental Oil Co.'s No. Apex-3, SW NE SW Section 34-36-65, is bottomed at 3,538 feet in sand and shale and is bailing.

Park County

Rocky Mountain Gas Co.'s No. 1 Oregon Basin Oil & Gas, C SW NW Section 32-511-00, South Oregon Basin, was completed as a gas well in the Cloverly at 1,330 feet and made 1,300,000 feet initial. Garland Oil Co.'s No. 2 Government, SE NE NW Section 14-56-98, Garland Dome, is fishing at 2,166 feet.

Washakie County

Wyoming Oil & Refining Co.'s No. 1 Frison, NW SW NW Section 14-48-91, Hidden Dome, is drilling at 1,100 feet.

Weston County

Osage Trust Co.'s No. 26 State, C NE SE Section 14-46-64, Osage Field, is drilling at 400 feet, and Albert Jones' No. 9 Bock, C SW NE Section 21-46-63, is drilling at 150 feet.

MONTANA

Glacier County

The Cut Bank Field began showing some of its old-time activity this week with five new locations and one completion. The completion was Olive Oil Co.'s No. 3 Winkler, W NE NW Section 35-35-6w, drilled to 2,804 feet. It cut the pay at 2,770-2,800 feet and oil rose 2,000 feet. It swabbed 145 bbls. first 24 hours.

The new operations follow: Montana Power Gas Co.'s No. 1 First Trust & Savings Bank, NW SE NW Section 27-36-5w, in the gas area, location. Montana Headlight Oil Co.'s No. 5 Yunck, NW NE NW Section 1-34-6w, moving in materials. L. R. Hannah, trustee, No. 1 State, Lot 5, Block 4, Section 12-33-6w, location. Consolidated Gas Co.'s No. 6 Tribal, C SW SW Section 10-34-6w, cellar completed. Dakota-Montana Oil Co.'s No. 2 Winkler, E NE NW Section 26-36-6w, rig on location.

Askins' No. 1 Askins, Lot 24, Block 33, Section 12-33-6w, is drilling at 1,700 feet. Consolidated Gas Co.'s No. 3 Tribal, NE NW NW Section 34-35-6w, is drilling at 2,070 feet, and No. 4 Tribal, NE SW NE Section 34-35-6w, cemented 7-inch at 2,920 feet with 50 sacks and is waiting. Gardner-Smith's No. 1 Tweedy, NE NE Section 36-33-6w, is ready to spud, and Indian Oil Co.'s No. 2 Winkler, W SW SW Section 23-35-6w, is fishing for 8¼-inch at 2,585 feet, total depth. Kately & Kaup's No. 1 Drumheller, Lot 1, Section 10-34-6w, is drilling at 2,000 feet, and Par Oil Co.'s No. 4 Haines, E SE SE Section 2-34-6w, is spudding at 150 feet. Bruce Radigan's No. 1 Connolly, NW SW NW Section 7-33-5w, is drilling at 475 feet, and R. C. Tarrant's No. 1 Connolly, C NE SE Section 31-34-5w, is drilling in at 2,775 feet with 500 feet of oil in the hole. Texas Co.'s No. 6 Hinkle, NE cor. Section 2-34-6w, is building rig.

Liberty County

J. H. Hamilton and others' No. 1 Northern Farms, C NE SW Section 10-37-5e, Flat Coulee, is drilling at 2,300 feet.

Pondera County

Conrad Refining Co.'s No. 1 Gjuillin, NW cor. SE Section 11-27-4w, Pondera Field, is drilling at 1,785 feet.

Toole County

Ward & Cruise's No. 1 Thompson, NW SE Section 28-35-3w, Kevin-Sunburst Field, a first report, is a near completion at 1,609 feet. It had the Sunburst sand at 1,425-65 feet and is running the 6⅝-inch. Another first report, A. E Crumley's No. 5 Shaw, NW SE SW Section 35-36-2w, is moving in materials. E. O. Reickhoff's No. 2 Government, SW cor. NE Section 3-35-3w, is spudding, and Texas Co.'s No. 5 Swears, C SW Section 9-35-2w, is moving in materials. W. M. Fulton's No. 1 Halter, NE cor. SE Section 17-35-2w, was drilled to 1,750 feet, in the Madison, and plugged back to 1,608 feet where it was shot with 50 quarts. It had 400 feet of sulphur water and a show of dead oil. Monopeg Oils, Ltd.'s No. 3 Dipple, S SW NW Section 28-35-1w, is showing for a producer in a stray sand at 1,350 feet and may run pipe and test.

UTAH

Arrowhead Petroleum Co. has decided to go ahead with its No. 2 Escalante, NW cor. NE Section 19-43-15, Bloomington district, Washington County, where 10 persons were killed recently in an explosion. A new derrick is going up. It is bottomed in a sand at 4,105 feet with a show of oil. The explosion occurred when at attempt was made to shoot the sand.

MICHIGAN SEVERANCE TAX

MUSKEGON, Mich., Apr. 1.—A bill to increase the oil and gas severance tax from 2 to 3 per cent was killed in the state house taxation committee. A similar bill is in committee in the senate but probably will be blocked.

● I've learned that drilling isn't as hard in a lot of ways as it used to be . . .

● I've learned I can stick to the job of making hole without monkeying around with a lot of side jobs that the old style, cranky ropes used to hand me . . .

● These preformed lines we use nowadays have caught up with the rest of our equipment. They fit the job. All the trouble that used to be built into ropes seems to have been left out.

● I've learned that Tru-Lay Preformed Rotary Lines are the lines for me.

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HOUSTON, TEXAS

California Fields

(Continued from Page 168)

Vista in Section 22-32-23, brought in on the pump doing 58 bbls. of 14.8 gravity oil per day from 676 feet. This well was finished with an 8⅝-inch liner carrying 265 feet of perforated. Honolulu Oil Corp. is making preparations to begin an aggressive drilling campaign in Section 14-32-24 as six new location have been staked in addition to the three wells now being drilled.

The Mount Poso Field of Kern County, which has been lying idle for several years, is going to receive some very careful attention during the next few months. The Shell and Union began developing this field last year following a period during which only a small amount of drilling was undertaken. Improved prices for fuel oil has prompted both companies to proceed with work and they have been consistently engaged in drilling operations during the past months. The Shell has staked six new locations on the Vedder lease in Section 9-27-28, while the Union has staked eight additional sites on the S. & M. property in Section 4-27-28. The Shell has just finished No. 5 Security in this field but final data have not yet been completed. This well should be good for about 800 bbls. per day. Over in the Round Mountain Field, the Honolulu Oil Corp. completed No. 27 in Section 18-28-29, and this new producer was brought in pumping 1,210 bbls. of clean 16.9 gravity oil per day from 1,969 feet after the hole had been plugged back from 2,007 feet. Reserve Oil & Gas Co. has suspended drilling operations on its No. 1 Tejon in the Wheeler Ridge district of Kern County due to the failure to pick up the anticipated pay at the projected depth. The suspension is only temporary and consequently the company may decide to resume drilling if the survey being conducted justifies such action.

Long Beach

Two new wells and two recompletions were chalked up as a result of drilling operations in the Long Beach Field during the past week. The new wells were the D. M. W. Corp.'s No. 1 Corbett, brought in pumping 314 bbls. of 27.1 gravity oil per day upon completion at 4,320 feet and Yunker & Cromwell's No. 1 Signal, which showed an initial pumping of 165 bbls. of 23.4 gravity oil per day from 4,629 feet. No. 1 Corbett was finished with a 4¼-inch liner carrying 115 feet of perforated and has a 7-inch water string landed and cemented at 4,197 feet. E. C. Arnold Drilling Co., which took over the Congress Oil Co.'s No. 1 Harvey some time ago, put this well on a pumping test after the hole had been plugged back from 5,927 feet to 5,711 feet but the output, 185 bbls. per day, was still cutting 35 per cent at last reports.

Geneva Marie Oil Co. is entitled to considerable credit for the completion of its No. 1 Signal this week because it ran into more trouble than would ordinarily be encountered in a dozen shallow wells. The well blew in barefoot doing 890 bbls. of 27.8 gravity oil from 4,218 feet in January, 1935, while the crew was drilling out the cement on the 7-inch water string landed at 3,740 feet. The well was subsequently killed and about 10 days later preparations were started to run liner. The hole was apparently a little tight, however, because the 5¾-inch liner froze at 3,779 feet. In order to take care of the problem a 4¾-inch liner was run through the 5¾-inch and landed on bottom. The well failed to result in a natural flow, despite the kick it showed during the water shut-off test, and artificial stimulation was resorted to. While being agitated, it showed a production of 904 bbls. per day until it sanded up a few days later. The 4¾-inch liner was then pulled and the 5¾-inch liner cut out below the shot of the water string and sidetracked. A new 4-inch liner was then run in and landed on bottom and a compressor installed. The well failed to respond, however, and the hole was cleaned out and a pump rigged up. Persistent efforts of the company were rewarded this week when the well was brought in pumping 381 bbls. of clean 26.9 gravity oil per day. The Shell Oil Co. made a production test of No. 10 Cherry Hill in the Long Beach Field this week but it failed to show any oil. This well, bottomed at 4,095 feet and finished with a 4¾-inch liner including 61 feet of perforated, came in flowing 460,000 feet of gas per day with not even a trace of crude oil.

Huntington Beach

Several wells are scheduled for completion in the Huntington Beach Field of Los Angeles Basin during the next 15 days and while production may be relatively small the Standard's No. 26 P. E. and No. 72-B should show fairly good production. The Steveo Oil Co. completed No. 1 Adle late in the week and this new well was brought in pumping 279 bbls. of clean 24.8 gravity oil per day from 3,843 feet. C. W. Camp's No. 1 Lambert was returned to production pumping 192 bbls. of 19.4 gravity oil per day after the hole had been plugged back from 4,359 feet to 3,238 feet. Over in the West Coyote Field, the Standard's No. 120 Murphy Coyote, completed last week, has built up to 1,416 bbls. and gas production has increased to 1,340,000 feet daily.

The Inglewood Field of Los Angeles Basin is showing a consistent increase in drilling operations and as a result we may anticipate the completion of several good wells during the course of the next few months.

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Kansas Fields

(Continued from Page 166)

berg, NW NE Section 30-18-2w, was completed for 287 bbls. of oil in 24 hours at 2,296 feet, total depth, 21 feet in the Kansas City lime topped at 2,275 feet.

Shell Petroleum Corp.'s No. 8 Decker, NW SE Section 11-19-2w, Ritz-Canton Pool of McPherson County, was a completion in the Viola lime logged from 3,368-68½ feet, total depth, running 385 bbls. of oil in 14 hours.

In the Hollow Pool of Harvey County, Marathon Oil Co.'s No. 6 Duerksen, SE NE NE Section 19-22-3w, had been deepened from 3,485 feet to a new total depth of 3,515 feet. Hunton lime was based at 3,503 feet and that formation upon being acidized with 1,000 gallons yielded 30 bbls. of oil in 24 hours.

First reports in McPherson County during the past week were as follows: Roth and Farrout's No. 5 Almen, NW SW SE Section 13-19-3w, cellar; Roth and Farrout's No. 2 Carlson, NW NE Section 24-19-3w, moving in machine; Marathon Oil Co.'s No. 4 Duerkson, NE SE NE Section 19-22-3w (old well drilled deeper), deepened from 3,492 feet to 3,516 feet and shot with 1,000 gallons of acid, no results; Goering Brothers' No. 1 Brainard, NE SW Section 3-23-2w, rigging up.

Sedgwick County

Sedgwick County operations for the week resulted in the completion of two oil wells in the Valley Center Pool and one dry hole and one oil well in the Robbins Pool, the latter pool getting the only new operation in the county for the week.

Corbett and Evans' No. 2 Boling, NE NW SW Section 6-26-1e, Valley Center Pool, was completed at a total depth of 2,686 feet, 123 feet in the Kansas City lime topped at 2,563 feet, for 50 bbls. of oil and 35 bbls. of water when opened up after it had been treated with acid.

Sovereign Oil Co.'s No. 3 Scherger, SW NW SW NW Section 6-26-1, Valley Center Pool of Sedgwick County, had Kansas City lime from 2,553-2,682 feet, total depth, and acid treatment of the lime yielded 40 bbls. of oil and 45 bbls. of water in 24 hours. It was completed.

In the Robbins Pool of Sedgwick County, Spencer and Trimmer's No. 1 Owens, SE NE SW Section 17-28-1, logged Chat formation at 3,068-3,188 feet, total depth, which produced 3 bbls. of water per hour. It was abandoned.

Magnolia Petroleum Co.'s No. 6 Robbins, NW SE Section 20-28-1, Robbins Pool of Sedgwick County, was completed for 502 bbls. of oil in the Chat at 3,084-3,109 feet, total depth.

Dickey Oil Co.'s No. 5 Nolan, SW SE NE Section 20-28-1, was a new operation and materials were being moved in.

Marion, Butler and Greenwood Counties

Marion County operations for the week resulted in the following: Youker and others' No. 1 Bernhardt, C SE NW Section 7-18-4, wildcat test about 3 miles southwest of the Lost Springs Pool, got a hole full of water in the Chat formation at 2,397-2,419 feet, total depth, and it was abandoned. White Star Oil Co.'s No. 11 Doyle, C NW NW Section 20-21-5, Florence-Urschel Pool, was drilling at 1,625 feet.

In Butler County, Poihamus Drilling Co.'s No. 1 Creed, SE NW SW Section 16-29-4, was dry and abandoned at 1,881 feet, total depth, 42 feet in the Kansas City lime topped at 1,839 feet. This test made 52 bbls. of oil in eight hours in a head flow after acid treatment but failed to stand up. Saco Oil Co. staked location for its No. 1-A McGinnis in the NE SE NE Section 9-27-6e.

In Greenwood County, Young and Raynolds' No. 1 Stover, NE SW Section 7-22-13e, was completed in pay sand at 1,111-14 feet, total depth, yielding 150 bbls. of oil and 50 bbls. of water in 24 hours. It had been acidized.

New operations in Greenwood County during week are as follows: Wetzel and others' No. 1-A Cross, NE SE NE Section 12-27-10, spudding; Mohawk Drilling Co.'s No. 1 Reno, NW NE SW Section 7-27-11, is an old well being deepened at 2,197 feet.

Elk County

Superior Oil Co. had completed its No. 5 Rorick, SW NE SE Section 22-31-10, Moline area of Elk County, found pay sand from 1,333-44 feet, which made 5 bbls. in 24 hours on the pump after acid treatment.

CANADIAN GAS PRODUCTION

OTTAWA, Ontario, Apr. 1.—The production of natural gas from all Canadian fields in January, as a recorded by the Dominion Bureau of Statistics, totaled 3,242,964,000 feet against 2,414,594,000 in December and 2,961,453,000 in January, 1934.

Imports of mixed (natural and artificial) gas in January totaled 9,700,000 feet worth $6,267 against 6,754,000 worth $4,052 in December.

TECHNICAL QUESTIONS ANSWERED

By Charles K. Francis, Ph. D., Technical Editor

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible.

Inquiries must be signed but only the given initials will be printed. The source of the question is considered to be confidential.

Questions requiring a discussion of patents, the use of intricate formulas, extended computations, or cost estimates cannot be considered.

When the matter is of general interest the reply will be published within a reasonable time.

Protecting Gas Pipe Lines From Corrosion and Treating of Gas

Our lines get badly corroded with frequent replacements necessary, due to hydrogen sulphide in the natural gas. Is there any way of protecting the pipe or treating the gas to prevent this damage and loss?—F. E. I.

Technologists agree that moisture and oxygen play a large part in the corrosion of metals and that deterioration is accelerated in pipe lines transporting gas containing hydrogen sulphide. This substance may be converted to the several acids of sulphur, or deposit sulphur, the specific chemical action depending upon the existing conditions. All of these act on metal.

The removal of hydrogen sulphide from a gas is the one adequate method for stopping the damage from this source, but this is not always feasible. The methods employed for this purpose include passage through caustic soda solution, over iron oxide or lime, and the treatment with special processes such as one well known in the industry, based on scrubbing the gas with a solution of sodium carbonate. A washing process has been devised by the Lone Star Gas Co., as mentioned in Natural Gas, December, 1934, page 30, for the purification of 10,000,000 cubic feet of gas flowing through a pipe line each day. This treatment has materially reduced corrosion.

The gas containing the hydrogen sulphide and oxygen is passed through a suspension of iron and zinc salts in a dilute soda ash solution. The oxygen is partly absorbed by the alkaline solution and serves to oxidize the metallic sulphides in the solution nearly as rapidly as they are formed. Cost of operation of this installation is about 0.18 cents per 1,000 cubic feet, largely due to the high depreciation rate of the scrubber caused by rapid corrosion. This depreciation cost may be decreased by the use of a stainless steel scrubber. Considerable quantities of free sulphur are formed in the process and means for the removal of this sulphur from the scrubber must be provided.

Many companies protect the inside of pipe with some coating material, such as paint, oil, tar and grease.

Removal of air and moisture from the entering gas will eliminate the internal corrosion of gas pipe lines but methods so far proposed for this purpose are too expensive. Dehydration is assisted where such substances as lime are used for reducing the hydrogen sulphide content.

Setting Point or Cold Test of Distillate Oils Free From Wax

What is the setting point of the nonresidual oils that are entirely free from wax?—H. O. H.

The setting point or cold test of petroleum oils that have been obtained as overhead products will be related to the type of the hydrocarbons that are present. All liquids have a solidifying point but it is the practice to look upon the wax content as directly responsible for the pourpoint and cold test. While the present solvent methods remove almost all of the wax, with a consequent lowering of the pourpoint, it is not practicable to eliminate all traces of it.

Investigations have been made of the relation of paraffin wax content to the pourpoint in which mixtures of fully treated distillates, freed from asphalt and all forms of wax, were made to contain various percentages of wax by the addition of fully refined wax. In these tests it was shown that the pourpoint for the liquid that contained no wax was between minus 30° and minus 40° F. While this relation would probably not hold for similar distillates from all petroleums, the work should be some indication of what may be expected as the ultimate limit.

Quantity of Carbon Black From Natural Gas and Plant Process

What is the yield of carbon black that should be obtained from natural gas? What process is used? Where could I obtain information covering the details of carbon black plant operation? Who builds such plants? —L. S.

The yield of carbon black from natural gas, as manufactured by the plants operating in the United States, seldom exceeds 2 pounds per 1,000 cubic feet of gas burned. Natural gas is essentially methane, CH_4, which contains 75 per cent carbon. If the gas were decomposed to nothing more than carbon and hydrogen, a yield of very close to 32 pounds of carbon from each 1,000 cubic feet would be obtained. It appears then that the efficiencies of the present methods are very low, when considering the theoretical possibilities. However, the decomposition of the hydrocarbons requires considerable heat, which is absorbed from the combustion of a large part of the carbon. The quantity of carbon used in this way depends upon the control of the air admitted for the burning of the gas.

Almost all, over 80 per cent, of the carbon black produced in the United States is made by what is called the channel process. The gas is burned as a smoky flame, through which iron channels pass, the carbon being deposited on the cold surface from which it is removed by scrapers, conveyed to bolting machines, then compressed and finally packed in paper bags, each of which contains 12.5 pounds. The operation is continuous and automatic.

The conditions closely watched include flame adjustment so that the rate of combustion will be low, favoring the formation of a soft, fluffy and deep black carbon. There must be no tendency for the product to be sticky or like varnish and the formation of hard gritty particles is highly objectionable.

The first use made of carbon black was in the manufacture of paint, printer's ink, stove polish and carbon paper but for some years the largest part of the production has been required for making automobile tires, the rubber for this purpose containing about 50 per cent carbon. Other uses include hard rubber articles of many sorts, crayons, insulating materials, coloring of cement, etc.

The references following are simply examples from the extensive literature covering the subject:

Francis, Ind. Eng. Chem., 20, 277, (1928). (See index of same, year 1928).
Spear and Moore, same, 18, 418, (1926).
Wiegand, same, 23, 178 (1931).
U. S. Bureau of Mines Bulletin 192, by Neal and Perrott, (1922).
The Oil and Gas Journal, June 16, 1927, page G-198; June 19, 1930, page 76, and April 2, 1931 page 114.

Methods Developed in U.S.S.R. For Manufacture of Rubber

My attention has been directed to an announcement in a London paper that a plant is under construction in U.S.S.R. which will manufacture rubber from some petroleum product. If you have any details on this I shall appreciate having the information about the process.—T. H.

The success attained by the chemists in the synthetical production of indigo, sugar and other substances that are normally derived from plants, has stimulated numerous efforts to produce rubber from various carbon compounds. The literature indicates that a material resembling rubber has been made by several different methods, but a substance identical with natural rubber has not been made by any artificial process. The difficulty appears to be that natural rubber contains some substance as an attending material, possibly something that might be termed a satelite, that contributes to its distinguishing properties and makes possible its wide utilization in the industries and in the arts. During the treatment of the rubber latex these attending substances aid in the chemical changes essential to some of the uses of pure rubber. It has not been possible to furnish synthetically exactly the same satelite that nature supplies.

The hydrocarbons of petroleum are considered a suitable raw material for making rubber but the expense involved when compared with the market price of rubber, as has been existing for the past five years, has caused much of the investigations of organic chemistry to be directed to other subjects.

Early in February of this year it was reported that an experimental pilot plant for the manufacture of rubber from petroleum gases was about to be put into operation in Moscow. Preliminary laboratory investigations have demonstrated the possibility of obtaining synthetic rubber from by-products of oil refineries. As much as 15 kilograms (33 pounds) of high quality rubber can be obtained from the by-products given off in the refining of one ton of oil. With the present capacity of the Soviet oil industry, this means 12,000 tons of synthetic rubber per year. The experimental plant, the construction of which is nearly completed, will produce 100 kilograms of artificial rubber per day. The experience gained here will be utilized in the construction of several similar plants in other parts of the Union. There are already several enterprises in Yaroslavl, Voronezh and other cities producing synthetic rubber from alcohol derived from potatoes. This method was developed by the late Lebedev. A group of Soviet scientists in Leningrad have perfected methods of obtaining synethetic rubber from various other by-products which were formerly almost entirely wasted, and a plant is now being completed in Erivian for its manufacture from calcium carbide.

Conversion Factor From Inches To Millimeters Standardized

The sizes of automobile parts are in some instances given in inches, in others in millimeters. When consulting books I find different equivalents mentioned so wish to know if there is any standard conversion figure?—V. J. P.

The American Standard ratio inches to millimeters is 25.4, which is also the accepted standard of many countries. This is explained as shown below, in Industrial Standardization, February, 1935, page 40.

In the United States the relationship between the inch and the millimeter, derived from the legal relationship between the yard and the meter, is with very great approximation 1 inch equals 25.40005 millimeters.

Because of the use of the metric system in foreign markets, some American industries are using both the inch and the metric systems. In industrial practice, the simplified factor 25.4 is sufficiently accurate, its deviation from the ratio 25.40005 being only two parts in one million.

Industry adopted the 25.4 factor through the procedure of the American Standards Association in 1933.

The Johansson master gauges used as the basis for the manufacture of block gauges for precision testing are made to the ratio of 25.400000 with a plus tolerance of 0.000002 inch (0.000051 mm.) per inch of length.

All block gauges manufactured since 1923 by the Ford Motor Co. for American industries have been adjusted according to the Johansson gauges, using the equivalent 1 inch equals 25.4 mm. with a progressive plus tolerance.

NATURAL GAS DEVELOPMENTS

James D. Sisler Joins Carnegie Natural Gas

James D. Sisler, former state geologist for West Virginia, is now connected with the Carnegie Natural Gas Co. with headquarters in the Frick Annex, Diamond Street. Pittsburgh, Pa.

Mr. Sisler is a graduate of West Virginia University and of Johns Hopkins

JAMES D. SISLER

University with degrees in geology and oil and gas engineering. He has had a varied experience in geological work, serving two years with the Maryland Geological Survey and later as associate geologist with the Pennsylvania Topographic and Geologic Survey. In addition he has been consulting geologist with the U. S. Geological Survey, consulting mining engineer, U. S. Bureau of Mines, and consulting engineer with the West Virginia Public Service Commission.

Mr. Sisler is the author of many technical papers, prominent among them being "The Bituminous Coal Fields of Pennsylvania," "Coal, Oil and Gas in the Appalachian District" and "Contributions to Oil and Gas Geology of West Virginia."

He is a fellow in the Geological Society of America, Society of Economic Geologists, Association of American State Geologists, American Gas Association, American Institute of Mining and Metallurgical Engineers, and the Coal Mining Institute of America.

MISSOURI-KANSAS LINE

NEW YORK, Apr. 1.—The petition of the Missouri-Kansas Pipe Line Corp. seeking permission to enter into an agreement with the Columbia Gas & Electric Co. to prevent the latter company from foreclosing on defaulted bonds and notes of a subsidiary of the Missouri-Kansas company, was denied at Wilmington, Del., by Chancellor Josiah O. Wolcott. The petition was opposed by a group of Missouri-Kansas stockholders.

In Chicago, Frank P. Parrish, president of the Missouri-Kansas Pipe Line Co., approved the action of the court, stating that it would constitute the first step in the rehabilitation of the Missouri-Kansas pipe line operation. The natural gas line extends from the Middle West to the Texas Panhandle.

Southwestern Gas Measurement Short Course Program Has Been Completed

The program for the eleventh Southwestern Gas Measurement Short Course at the University of Oklahoma, Norman, April 23, 24, and 25, has been very closely patterned after the successful programs of past years.

The program follows:

Tuesday Morning, April 23

8:00 to 9:30

Registration: Hall of the Engineering Building.

Equipment exhibition.

9:30 to 11:30

Presiding: D. C. Williams, Kay County Gas Co., chairman of Meter School Committee.

Introduction of Doctor Bizzell: E. F. McKay, manager of Oklahoma Utilities Association.

Address of Welcome: Dr. William Bennett Bizzell, president, University of Oklahoma.

Introduction of Meter School Committee: D. C. Williams, Kay County Gas Co.

Natural Gasoline Association and American Gas Association: Natnral Gasoline Association of America and the Meter School, by W. F. Lowe, secretary.

Natural Gas Department of A.G.A. and the Meter School, by A. E. Higgins, secretary.

Address: N. C. McGowen, president, United Gas Co.

Announcement of Committee for Study of Practical Methods: Ray Rountree, United Gas Co., chairman.

Tuesday Afternoon

1:00 to 2:00

(a) Fundamental Principles of Regulators, T. H. Thorn, Chaplin-Fulton Regulator Co.

(b) Domestic Meters, Metric Metal Works of American Meter Co.

(c) Large Capacity Positive Meters, W. R. McLaughlin, Pittsburgh Equitable Meter Co.

(d) Westcott Orifice Meters.

(e) Functions of Field Meter Men, George Greiner, Phillips Petroleum Co.

(f) Problems of Elementary Gas Laws, E. F. Dawson, university faculty.

2:00 to 3:00

(a) Fundamental Principles of Orifice Meters, John C. Diehl, Metric Metal Works.

(b) Orifice Meters, A. D. MacLean, Pittsburgh Equitable Meter Co.

(c) Large Capacity Positive Meters, Metric Metal Works.

(d) Low Pressure Regulators, W. J. McArt, Pittsburgh Equitable Meter Co.

(e) Calculation of Orifice and Positive Meter Charts, A. E. Koenig, Magnolia Petroleum Co.

(f) Field Testing of Large Capacity Positive Meters, B. Porter, United Gas Co.

3:00 to 4:00

(a) Fundamental Principles of Positive Meters, A. D. McLean, Pittsburgh Equitable Meter Co..

(b) Low Pressure Regulators, American Meter Co.

(c) Domestic Meters, H. A. Kahler, Sprague Meter Co.

(d) Foxboro Orifice Meters, L. K. Spink.

(e) Operation of Calorimeter, S. H. Cromer, university faculty, assisted by E. M. Tignor, Cities Service Gas Co.

(f) Emco-McGaughy Integrator, J. L. Cottrell.

(g) Problems in Elementary Gas Laws, E. F. Dawson, university faculty.

Wednesday Morning, April 24

9:00 to 12:00

D. C. Williams, presiding.

Physics of Orifice Meter Coefficients, H. S. Bean, Bureau of Standards, Washington, D. C.

Wednesday Afternoon

1:00 to 2:00

(a) Determination of Line Losses, Etc. (1) High Pressure Lines, Earl Kightlinger, Arkansas-Louisiana Pipe Line Co.; (2) Low Pressure Lines, R. W. Parker, Oklahoma Natural Gas Corp.

(b) Foxboro Orifice Meters, L. K. Spink.

(c) Domestic Meters (Emco), J. H. Baker, Pittsburgh Equitable Meter Co.

(d) Westcott Orifice Meters and Rate and Volume Control.

(e) Chaplin-Fulton Regulators, Thomas H. Thorn.

(f) Problems of Wet Gas Measurement and Regulation, round table discussion, George P. Bunn, assisted by G. W. McCullough, Phillips Petroleum Co.

(g) Fisher Capacity Charts, Lyle E. Eige, Fisher Governor Co.

2:00 to 3:00

(a) Effect of Barometric Pressure on Gas Measurement, E. E. Stovall, Lone Star Gas Co.

(b) Domestic Meters, Metric Metal Works of American Meter Co.

(c) Problems of Regulator Freezing, M. A. Hardie, Jr., Montana Power Co.

(d) Bell Prover Operation, A. D. McLean, Pittsburgh Equitable Meter Co.

(e) Foxboro Pressure Control, L. K. Spink.

(f) Care and Operation of Orifice Meters, Max Watson, Canadian River Gas Co.

(g) Reynolds Gas Regulator Co., Ralph C. Hughes.

3:00 to 4:00

(a) Meter Shop Practice, E. C. McAninch, Oklahoma Natural Gas Corp.

(b) Domestic Meters, H. A. Kahler, Sprague Meter Co.

(c) Large Capacity Positive Meters. W. R. McLaughlin, Pittsburgh Equitable Meter Co.

(d) Bell Prover Operation, American Meter Co.

(e) Well Capacities, E. M. Tignor, Cities Service Gas Co.

(f) Calculation of Orifice and Positive Meter Charts, A. E. Koenig, Magnolia Petroleum Co.

(g) Reconditioning of Mercury, H. F. Goodenough, Refinery Supply Co.

4:00 to 5:00

Inspection of Laboratories: Fluid Meter Tests—A.S.M.E. Regulator Freezing Problems—Sponsored by A.G.A.

Annual banquet, Wednesday night at 6 o'clock, University Union Ballroom.

Thursday Morning, April 25

9:00 to 12:00

D. C. Williams, presiding.

Announcing of prize papers, D. C. Williams, Kay County Gas Co.

College of Engineering and the Gas Measurement Short Course, J. H. Felgar, dean of the College of Engineering.

"Graphic Accounting Methods on the Entire Property as Well as in the Measurement Department," B. P. Stockwell, Oklahoma Corporation Commission.

Paper, "Moisture Content in Natural Gas," prepared by E. G. Hammerschmidt, Texhoma Natural Gas Co., presented by C. E. Mouck, Texhoma Natural Gas Co.

Address, E. F. Schmidt, superintendent, Lone Star Gas Co.

Thursday Afternoon

1:00 to 2:00

(a) Proper Installation of Orifice Meters and Application of Coefficients, by H. S. Bean, Bureau of Standards, Washington, D. C., assisted by J. E. Overbeck, Columbia Engineering Co.

(b) Bell Prover Operation, J. H. Baker, Pittsburgh Equitable Meter Co.

(c) High Pressure Regulators, American Meter Co.

(d) Foxboro Pressure Controls, L. K. Spink.

(e) Large Capacity Positive Meters, American Meter Co.

(f) Problems of Elementary Gas Laws, E. F. Dawson, university faculty.

(g) High and Low Pressure Regulators, Charles D. Peterson, Fisher Governor Co.

2:00 to 3:00

(a) Proper Installation of Orifice Meters and Application of Coefficients, by H. S. Bean, Bureau of Standards, Washington, D. C., assisted by J. E. Overbeck, Columbia Engineering Co.

(b) Chaplin-Fulton Regulators, Thomas T. Thorn.

(c) Bell Prover Operation, American Meter Co.

(d) High Pressure Regulators, W. R. McLaughlin, Pittsburgh Equitable Meter Co.

(e) Domestic Meters (Ironclad), W. J. McArt, Pittsburgh Equitable Meter Co.

(f) Reynolds Gas Regulator Co., Ralph C. Hughes.

3:00 to 4:00

(a) Proper Installation of Orifice Meters and Application of Coefficients, by H. S. Bean, Bureau of Standards, Washington, D. C., assisted by J. E. Overbeck, Columbia Engineering Co.

(b) Domestic Meters, Sprague Meter Co.

(c) Gravitometer, H. F. Goodenough, Refinery Supply Co.

(d) Low Pressure Regulators, J. H. Baker, Pittsburgh Equitable Meter Co.

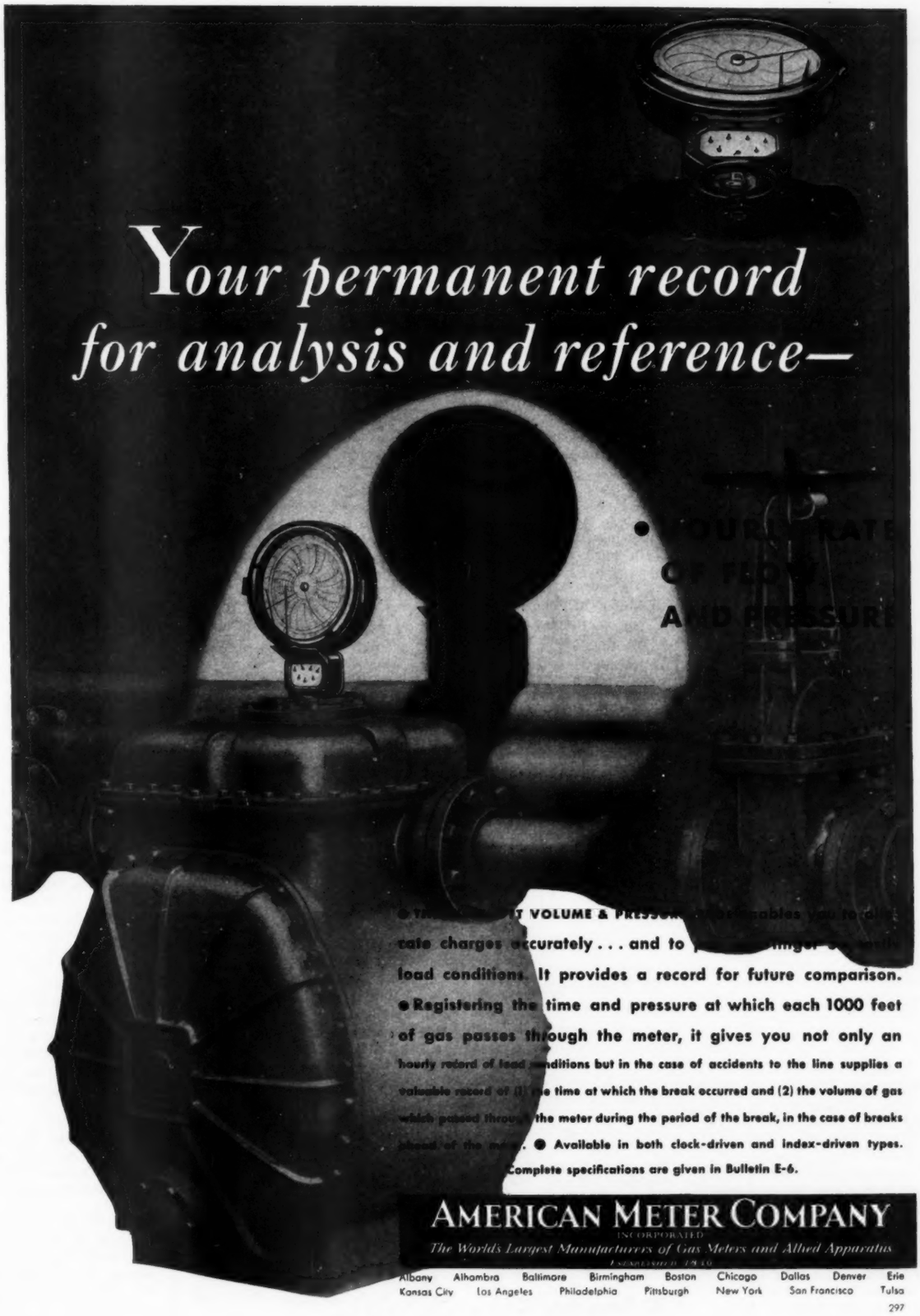
(e) Operation of Slide Rule and Gas Rule, H. V. Beck, university faculty.

ANTITRUST PROCEEDINGS

AUSTIN, Tex., Apr. 1.—Complaints filed in District Court at San Antonio, Tex., charged N. C. McGowen, Shreveport, La., president of United Gas Public Service Co., and three others with violating the Texas antitrust law in connection with the sale of natural gas to the San Antonio Public Service Co. April 10 was set as the date for an examining trial. Affidavit was made by Charles M. Dickson, attorney for the San Antonio Utilities League. It named, along with Mr. McGowen, H. L. Dickerson, New York; H. H. Hargrove and J. V. Strange of Houston, three vice presidents of the company.

INDIANA GAS EXTENSION

INDIANAPOLIS, Ind., Apr. 1.—Construction of a pipe line which will take natural gas from Knox County, Indiana, into Terre Haute, Ind., for consumption will be started shortly, it has been announced by representatives of the Kentucky Natural Gas Co. Between 15 and 20 wells in the Oaktown Field, with an open well flow of between 24,000,000 and 30,000,000 feet, will be tapped by the line.



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297

PERSONAL PARAGRAPHS

FRANK A. HERALD, consulting geologist, Fort Worth, Tex., was a Tulsa visitor last week.

* * *

JOHN MELVIN, of Mount Pleasant, Mich., returned last week from a business trip to Burgettstown, Pa.

* * *

WESLEY A. MORTIMER, local manager of Wyoming Gas Company, Greybull, Wyo., has been made a director of that company.

* * *

JOHN ACKARD, who is drilling a wildcat on the Daniels ranch near Douglas, Wyo., returned to Douglas following a visit with his family at Colby, Kans.

* * *

E. L. ESTABROOK, EUGENE STEBINGER, and W. C. SHUTTS, of Standard Oil Company of New Jersey, recently visited that company's holdings in Venezuela.

* * *

BRIG.-GEN. SIR SAMUEL H. WILSON, has been appointed a director of Apex (Trinidad) Oilfields, Ltd., to succeed OLIVER V. G. HOARE, who has resigned.

* * *

DR. VICTOR HENNY, European representative of the Universal Oil Products Company, Chicago, has arrived in London, England, at the conclusion of his recent trip to the United States.

* * *

C. C. WARNER, land department of the Stanolind Oil & Gas Company, with headquarters in Casper, Wyo., is convalescing at his home following a short stay in the Natrona County (Wyoming) Memorial Hospital.

* * *

R. E. DONOVAN, GEORGE KNOX and J. J. WILT, of the Standard Oil Company of California, were the principal speakers at the March meeting of the San Joaquin Valley Chapter of the American Petroleum Institute which was held in the Standard's recreation hall in Taft, Calif.

* * *

I. B. CHITTENDEN is with the Lone Star Refining Company, Gladewater, Tex.

* * *

W. J. DAVIS, Houston, Tex., has been appointed on the Gulf Coast Texas Rig Building Committee, District No. 2.

* * *

GEORGE S. BALLEW is production engineer for the Natural Gas Development Company in the Oklahoma City Field.

* * *

JOHN D. ROCKEFELLER, JR., and MRS. ROCKEFELLER, JR., are now in Italy on a vacation trip. They will be gone two months.

* * *

JOHN L. LANDFAIR has been appointed secretary of the Labor Subcommittee "F," of the Planning and Coordination Committee.

* * *

V. N. ANDREW, of the International Petroleum Company, Ltd., left New York City, March 30, on the Grace liner, Santa Maria, for Peru.

* * *

EARL E. DAVIES, representing the National Analine & Chemical Company, Inc., of Chicago, is spending several weeks visiting offices of refining companies in the Mid-Continent and will then spend about a week visiting Gulf Coast plants.

H. S. AUSTIN, director of pipe line construction for the Iraq Petroleum Company, is on a business trip to the United States.

* * *

JAMES MENEFEE arrived in Venezuela recently for work with Standard Oil Company of Venezuela's seismograph parties.

* * *

W. D. HAMM, regional geologist for the Gulf Coast of the Shell Petroleum Corporation, is on a visit to The Hague, Holland.

* * *

PAUL B. HANSEN and J. P. PERRY, drillers, employed by Standard Oil Company of Venezuela, returned to the United States recently.

* * *

HAROLD DUCE, of Denver, Colo., was recently employed by Standard Oil Company of Venezuela and assigned to the general offices in Caripito.

* * *

H. F. MOSES, geologist, Carter Oil Company, has been recently transferred to a new office opened by that company at the Park Hotel, Mount Pleasant, Mich.

* * *

F. C. PLATT, petroleum engineer of Buenos Aires, Argentina, is in Los Angeles, Calif., on a business trip but will return to South America early in April.

* * *

A. W. MILFORD, assistant secretary of the Union Oil Company since 1929, was elected a member of the board of directors of California Taxpayers Association a short time ago.

* * *

W. J. BERNIER, of Clare, Mich., prominent operator, contractor and promoter in Central Michigan oil and gas fields, returned last week from a week's business trip to New York City.

* * *

J. F. CULLEN, division manager, Casper, Wyo., and R. B. HAMILTON, district superintendent, Salt Creek Field, of the Stanolind Oil & Gas Company, are in Tulsa, at company headquarters, on business.

DR. E. N. HAGUE, of the Sunbury research staff of the Anglo-Persian Oil Company, has been elected a Fellow of the Institute of Chemistry.

* * *

GUS BLAZE, of Shelby, Mont., was in Casper, Wyo., recently. Mr. Blaze is an operator in the Kevin-Sunburst Field in northern Montana.

* * *

W. M. FULTON, of Shelby, Mont., visited Calgary, Alberta, recently in connection with prospective development work in the Montana fields.

* * *

CHARLES C. TOOMEY, president, Midco Oil Corporation, Tulsa, has recently returned from a business trip to Chicago and Kansas City, Mo.

* * *

WARREN and CLARENCE RICHARDSON have returned to their home in Cheyenne, Wyo., after a trip to the Mediterranean Sea and the Holy Land.

* * *

PAUL BLAZER, of the Ashland Refining Company, is to address the Indiana Independent Petroleum Association at its convention April 10 and 11 at Indianapolis, Ind.

* * *

IRA A. SMITH, representative for the Standard Oil Company (Indiana), left Tulsa to attend a marketing meeting of company representatives in Kansas City, Mo., on Friday.

* * *

PAUL L. BROOKS, sales manager, Parkersburg Rig & Reel Company, Parkersburg, W. Va., was in Tulsa last week and is making a tour of the Mid-Continent offices of his company.

* * *

J. A. NILES, petroleum engineer, Stanolind Oil & Gas Company, Tulsa, presented a paper on "Design and Construction of a Portable Rotary Unit," before the Petroleum Engineers Club in Tulsa.

* * *

J. W. (JACK) BATES, with Helmerich and Payne, drilling contractors, Tulsa, addressed a meeting of the Petroleum Engineers Club on "Practicability and Advantages of Portable Drilling Units."

* * *

H. L. CHAPMAN, of Tulsa, recently returned to Venezuela after a vacation in the United States.

* * *

C. E. WRIGHT, of Williamsport, Pa., spent several days recently on business in Mount Pleasant, Mich.

* * *

M. R. COWELL, of Gold Standard Oils, Ltd., of Wainwright, Alberta, is on a business trip to Toronto, Ontario.

* * *

ANNOUNCEMENT is made of the birth at Negritos, Peru, on March 9 of a daughter to MR. and MRS. LORNE DUNCAN.

* * *

HENRY M. DAWES, of the Pure Oil Company, was in Washington, D. C., for the recent meetings of the Planning and Coordination Committee.

* * *

CHESTER D. WHORTON, geologist for Godfrey L. Cabot, Inc., has moved his office from Coudersport, Pa., to Olean, N. Y. His address is care of Godfrey L. Cabot, Inc., P. O. Box 561, Olean, N. Y.

* * *

WYNNE MERRILL and family, of Petrolia, Ontario, who have been spending four months in Canada on furlough, have returned to Negritos, Peru, where Mr. Merrill is superintendent of garages for the International Petroleum Company.

DO YOU REMEMBER?

From The Oil and Gas Journal Files

25 Years Ago

March 31, 1910

George Coyle, assistant general superintendent of the Prairie Oil & Gas Co., returned to Tulsa after completing the Arkansas section of the line from Oklahoma to Baton Rouge, La.

E. R. Perry, secretary of the Mid-Continent Oil and Gas Producers Association, was chosen president of the Oklahoma Oil and Gas Producers Association which succeeded the former organization.

The U. S. Supreme Court upheld the gross receipts tax of 2 per cent levied by the Texas legislature.

20 Years Ago

April 1, 1915

Oklahoma attorneys were discussing the ambiguity and possible unconstitutionality of the gross production tax passed by the Oklahoma legislature March 10.

Another gusher in the Thrall Pool, Williamson County, Texas, estimated making from 3,000 to 4,000 barrels daily, was the feature on the Gulf Coast.

Work was progressing on the pipe line from the Cushing Field to Wood River, Ill.

The Crichton Field in the Red River Valley was the center of interest in Louisiana.

10 Years Ago

April 2, 1925

The Smackover Field's possibilities were the big topic in Arkansas.

Venezuela drilling was increasing rapidly with La Rosa Field the most active spot.

The Suth Liberty Field raised the production of the Gulf Coast to the highest point of the year, 103,975 barrels.

Mexican shipments dropped 1,000,000 barrels in a month.

GEORGE RAWLINGS, of Chatham, Ontario, has returned from a business trip to Columbus and Lancaster, Ohio.

* * *

W. V. VIETTI, chief petroleum engineer for the South Texas division of the Texas Company, has returned from a trip through the various fields of Southwest Texas.

* * *

A. W. ROGERS, a director of North Venezuelan Petroleum Company, Ltd., arrived in La Guaira for a visit in connection with his company's operations in eastern Falcon.

* * *

L. P. LOCKRIDGE, manager of the domestic lubricating sales department for the Sinclair Refining Company at New York, was a business visitor to the company's offices at Houston, Tex., last week.

* * *

COL. E. O. THOMPSON, chairman of the Texas Railroad Commission, was in Washington, D. C., for several days attending hearings on a railroad rate case before the Interstate Commerce Commission.

* * *

AXTELL J. BYLES, president of the American Petroleum Institute, was in Washington, D. C., for three days during the past week, attending meetings of the Planning and Coordination Committee.

* * *

F. R. COATES, of the Cities Service Oil Company, New York, was in Washington, D. C., for a few days attending meetings of the Planning and Coordination Committee and the Refining Subcommittee.

* * *

CARL M. SMITH, district land man in the Panhandle Field of Northwest Texas, for the Skelly Oil Company, was a visitor in Tulsa last week.

* * *

A. R. NUTTER, manager of the Oil Well Supply Company store at Mount Pleasant, Mich., has been transferred to the division offices of the company in Oil City, Pa. He was succeeded April 1 by F. D. SMITH.

* * *

RALPH LINNION, production superintendent of the H. F. Wilcox Oil & Gas Company, has been moved from Pampa, Tex., to Hutchinson, Kans., and is directing the Wilcox activities in the Sunflower fields.

* * *

HAROLD NUTTING, of Chicago, Ill., president and general manager of the Mid-American Oil Company, was in Casper, Wyo., purchasing supplies for the company's wildcat on the Sheep Creek structure, Fremont County, Wyoming.

* * *

J. A. de LANOY, director of purchases for the Asiatic Petroleum Corporation and Anglo-Mexican Petroleum Corporation in New York, sailed on a business trip for Europe on the S. S. Majestic. Mr. de Lanoy expects to return about May 1.

* * *

EARL A. TREAGER, formerly with Skelly Oil Company, Tulsa, and now chief naturalist with the National Park Board, Washington, D. C., gave a very interesting motion picture travelogue of many of the national parks before the Tulsa Geological Society.

* * *

DR. VIRGIL R. D. KIRKHAM, of Saginaw, Mich., addressed the American Association of Petroleum Geologists at the recent annual meeting in Wichita, Kans., on "The Origin of Fields in the Michigan Basin." He also presented a paper on current Michigan activities.

* * *

PROF. UMBERTO PUPPINI, the eminent Italian scientist, who in recent years has been Minister of Communications, has been appointed president of the A.G.I.P., the Italian government's oil organization. This post has been vacant since the death of PROF. A. MARTELLI, some considerable time ago.

Retires After 44 Years of Service

The recent retirement from the International Petroleum Company directorate of Alfred E. Burns marked the close of 25 years' continuous service with the Toronto company and its predecessors in South America, and of a career of 44 years in the producing end of the oil industry.

ALFRED E. BURNS

Born in Seaforth, Ontario, Mr. Burns received his petroleum christening in 1890 when as a youth he worked on a Canadian cable tool rig in Moore Township, Lambton County, Ontario, when the Ontario fields were reaching their peak production. In 1893 he saw his first foreign service as one of the Canadian experts recruited by the late William H. MacGarvey for the Galician fields. After two years he returned to Canada, but from 1896 to 1900 he saw service in Alsace, then a German province; and later he spent nine years with the Anglo-Russian Oil Company in the Caucasus.

In 1909 Mr. Burns went to Peru for the Lagunitos Oil Company, and in 1912 he joined the London & Pacific Petroleum Company in the same field. A drilling foreman when International Petroleum Company took over the field in 1914, he was made superintendent of drilling in 1917, and two years later general manager of all field operations. He became a director of the company in 1921. He had charge also of the development of the Tropical Oil Company concession in Colombia.

W. E. GROGAN, driller, and F. W. LYON, transportation foreman, employed by Standard Oil Company of Venezuela, are in the United States on a vacation.

* * *

A. C. (STEVE) STENSGAARD, formerly chief clerk and assistant purchaser for the Boviard Supply Company, Tulsa, has been transferred to the sales department, in charge of the Tulsa district.

* * *

CAPT. R. L. BROOKINGS, J. E. ALLEN, H. F. MILLON, N. G. JOSEPH, and JOHN NELSON, Standard Oil Company of Venezuela's aerial survey staff, have returned to Venezuela after a vacation in the United States.

* * *

JOHN McFAYDEN, vice president and manager of the western division of the Ohio Oil Company, left Casper, Wyo., for California where he will inspect company properties and operations on the Pacific Coast. He will be on the West Coast two weeks.

* * *

CHARLES B. PETERSON, Tulsa, district manager, Fisher Governor Company, Marshalltown, Iowa, drove back from a visit to his home office in about 12 hours one day last week. He is now on a swing around Louisiana and eastern and southern Texas.

* * *

R. C. TUTTLE has been elected a director of the Atlantic Refining Company. He succeeds R. D. LEONARD who resigned due to ill health. W. C. YEAGER has been elected a vice president of the company in charge of domestic sales, the position formerly held by Mr. Leonard. J. A. COREY has been made assistant general manager of domestic sales.

* * *

H. D. PATRIDGE, of Bartlesville, Okla., has been endorsed for district vice president of the National Association of Purchasing Agents by the Tulsa association, it has been announced. This endorsement is equivalent to election. Mr. Patridge is a past president of the Tulsa association, and present first vice president of the Petroleum Motor Transport Association. He is manager of purchases for the Indian Territory Illuminating Oil Company.

FRED E. COOPER, of Tulsa, was a recent business visitor in Mount Pleasant, Mich.

* * *

R. E. COLLOM, vice president of Continental Oil Company, Los Angeles, Calif., left a few days ago for Ponca City, Okla., on business in connection with the company.

* * *

ROBERT WHITE, special sales representative for the Standard Oil Company of New Jersey, spent several days in Tulsa the past week visiting refining company offices on his way to the Pacific Coast.

* * *

S. F. SHAW is consulting engineer for the Mid-Texas Petroleum Company in the Oklahoma City Field, in addition to acting in the same capacity for the Westgate Oil Company and the Grison Oil Company.

* * *

FRED G. LOVE, for the past nine years with the sales department of the Smith Separator Company, has become associated with Nowery J. Smith Supply Company of Houston, Tex., as general sales representative.

* * *

E. J. SADLER, vice president and director of the Standard Oil Company (New Jersey), and a group of executives of subsidiary companies, left New York City, March 30, on the French liner, Paris, on a trip to European points. The party included GEORGE W. GORDON, EUGENE HOLMAN, HERBERT EKLOF, HARRY S. SHOEMAKER, HARRY H. HILL, and STEWART P. COLEMAN.

* * *

K. VAN ZONNEVELD, representing Harris & Dixon, Ltd., London, England, is now in the United States on a business trip.

* * *

D. D. DURR, of the Associated Oil Company, has been appointed to the position of assistant advertising and sales promotion manager and will maintain headquarters at the Los Angeles, Calif., office of the company in the Pacific Electric Building.

* * *

P. W. FENTON, of New York, arrived in Tulsa for a short visit the past week. He lived in Tulsa until about a year ago, when he was transferred to become purchasing agent for the Tide Water Oil Company. He was a former president of the Tulsa Purchasing Agents Association.

* * *

H. G. SCHIVELEY, formerly sales manager for several Mid-Continent refining companies, has just completed a survey of the marketing situation from the Rio Grande to Monterrey, in northeastern New Mexico. After spending a fortnight in Tulsa he has returned to Corpus Christi, Tex.

* * *

A. IRVING LEVORSEN, chief geologist, Tide Water Oil Company, Houston, Tex., and recently elected president of the American Association of Petroleum Geologists at the Wichita, Kans., meeting, was in Tulsa several days last week conferring with company officials and visiting friends.

* * *

WILLIAM G. LANE, Lane-Wells Company, Los Angeles, Calif., is in the Mid-Continent district on business for his company. C. E. WELLS, formerly manager of the Tulsa office has been transferred to California and is succeeded at Tulsa by M. E. MONTROSE, formerly manager of the Shreveport, La., office of the General Electric Company.

* * *

JOHN C. NICKLOS, superintendent of Gulf Coast operations for the Continental Oil Company, has resigned, effective April 1, to engage in business with his brother, ERNEST NICKLOS, who left the company, of which he was vice president, several months ago. The Nicklos brothers have acquired, from the Continental Oil Company, a lease with two producing wells at Tomball, and also will do general contract drilling.

Oklahoma Fields

(Continued from Page 170)

bbls. per day. At the end of the nine-hour gauge it was shut in for additional tankage.

Marathon Oil Co.'s No. 2 Ball, NW SW NE Section 19-12n-1w, Nicoma Park Pool of Oklahoma County, was showing for a light producer in the Prue sand at 6,160 feet, total depth. The sand was broken with showings of lime and shale being returned in cores taken at 6,125-27 feet and 6,137-50 feet and 6,150-60 feet. After a 10-quart shot it swabbed 42 bbls. of oil in 24 hours.

Greater Seminole Area

The most important development for the Greater Seminole area for the past week was the opening of the new Misener sand pool by the Carter Oil Co. in its No. 1 Black, C NE SE Section 14-10-6, Seminole County. The new pool lies between the Searight Pool and the Keokuk Pool and three-quarters of a mile north of the old Prairie Oil & Gas Co.'s No. 1 Carolina which produced 155 bbls. in 24 hours from Misener sand. No. 1 Black logged Misener sand at 4,127-47 feet, total depth, which put 1,150 bbls. of oil in the tanks in 24 hours.

In the Seminole Pool, Sinclair Prairie Oil & Gas Co.'s No. 1 Boring, NE NW NW Section 19-9-7, based at 4,060 feet, total depth, filled 100 feet with oil and 100 feet of water and it was plugged back to 4,057 feet in Hunton lime topped at 3,996 feet where it was treated with acid. It was completed for 20 bbls. of oil and 10 bbls. of water a day.

Amerada Petroleum Corp.'s No. 1 Kodden, NW SW Section 13-6-5, Grayson Pool in Seminole County, pumped 301 bbls. of oil in 24 hours, for its completed gauge. This test was drilled to the second Wilcox sand 3,945-49 feet, total depth, which filled the hole with water. It was then plugged back to 3,845 feet in Simpson dolomite, topped at 3,774 feet, and acidized.

In the Sasakwa Pool of Seminole County, Roy J. Pierce's No. 1-A Spillman, C SW SW Section 7-6-8, pumped 40 bbls. of oil in 24 hours from Gilcrease sand drilled from 2,808-94 feet, total depth, after sand had been shot with 100 quarts of nitroglycerin.

St. Louis Sector

Vivian Oil Co.'s No. 1 King, SW SE NW Section 29-8-4, north end of the St. Louis Pool in Pottawatomie County, was a failure at 4,545 feet, total depth, in Hunton lime topped at 4,335 feet.

Magnolia Petroleum Co.'s No. 1 Williamette, SW NE Section 12-7-4, St. Louis Pool, had Hunton lime 3,727-3,928 feet, total depth, which swabbed 174 bbls. of oil in 48 hours after acid treatment. It was completed.

Clark and others' No. 1-A Null, NW SE Section 15-7-4, St. Louis Pool of Pottawatomie County, was a location abandoned. Same operators' No. 1-A Standridge, SW NE Section 15-7-4, was a location abandoned.

Pontotoc County

Three more wells of gusher capacity were added to the Fitts Pool list of Bromide sand wells during the week. Burke-Greis' No. 1 Chambers, NE NW Section 36-2-6, was a quarter-mile extensioner to the pool with an initial gauge of 934 bbls. of oil on six-hour potential test flowing through tubing. Bromide lime topped at 4,230 feet, first sand 4,330 feet, second sand 4,408-40 feet, and total depth 4,444 feet, 4 feet in McLish lime.

Ed Moore and others' No. 1 Craddock, NW SW Section 29-2-7, Fitts Pool, topped Bromide lime at 3,985 feet, first sand at 4,080 feet, second sand 4,170 feet, McLish lime 4,202 feet and at a total depth of 4,204 feet was completed for 1,246 bbls. of oil in two hours flowing through casing. Gas was 5,500,000 feet.

Carter Oil Co. completed its No. 5 Hardin in SE NE SW Section 30-2-7, Fitts Pool, for 1,031 bbls. of oil the first two hours flowing through casing. Bromide lime topped at 3,895 feet, first sand 4,000 feet, second sand 4,050 feet, McLish lime 4,105 feet and total depth 4,120 feet.

Altus-Mangum-Frederick

The Altus-Mangum-Frederick district of southwestern Oklahoma saw four wells fall by the wayside, two of which were wildcat tests, and one oil well being officially completed. Gypsy Oil Co.'s No. 1 Edwards, SE cor. Section 3-1-20w, Altus Pool, was completed for 15 bbls. on the pump from granite wash formation logged at 1,649-56 feet. Total depth was 1,667 feet in lime.

Selby Oil Co.'s No. 1 Hold, a wildcat test in the SE SW Section 15-2-20w, a failure in the granite wash logged at 1,740-65 feet, was abandoned at 1,998 feet, 11 feet in the Cisco lime, which made 4 bbls. of water per hour.

Harrel-Davis Oil Co.'s No. 1 Sneed, SW NW Section 1-1-20w, Altus Pool of Jackson County, was abandoned at 1,515 feet, total depth, when the granite wash drilled from 1,436-48 feet was dry.

J. Garfield Buell and others' No. 1 Cole, NE NW Section 3-1-20w, Altus Pool of Jackson County, logged granite wash from 1,156 to 1,560 feet, which had small oil shows in the upper section but produced 5 bbls. of water per hour in the base. Total depth was 1,601 feet in brown shale.

Dick Scheig and others' wildcat, No. 1 Cole, NE SE SE Section 5-1-20w, Jackson County, was dry and abandoned at 1,609 feet. A show of gas was had in granite wash at 1,295-1,311 and 1,558-1,605 feet.

Comanche-Cotton Counties

In the Lawton district of Comanche County, Johnson and Landall's No. 2 Johnson, SE SW SW Section 26-2-11w, was completed for 1 bbl. a day on the pump, production coming from a shallow sand found at 357-73 feet, total depth, which was shot with 10 sticks of dynamite.

Stephens County

Clark and Cowden's No. 4 (Twin) Payne, SE SW SE SW Section 2-1-5w, Doyle Pool in Stephens County, encountered sand from 1,284-89 feet, total depth, pumping 20 bbls. on its completed gauge.

In the Empire Pool of Stephens County, Louis Sikes' No. 7 Franklin, SE cor. Section 18-1s-8w, was completed for 1,500,000 feet of gas from sand 1,751-81 feet, total depth.

George L. Pace's No. 6 (twin) Gilworth, NE NW Section 2-2s-8w, Comanche Pool of Stephens County, logged sand 1,611-16 feet, total depth, being completed for 18 bbls. of oil and 50 bbls. of water a day.

W. J. McAlister's No. 1 Leach in the Comanche Pool of Stephens County, SE NW Section 11-2s-8w, was dry and abandoned at 1,775 feet.

E. W. Stevenson's No. 3 Harris, NE SW SW SW Section 3-2s-5w, Stephens County, was completed for 2,000,000 feet of gas in sand found at 845-60 feet, total depth.

Murray County

Two wildcat tests in Murray County were abandoned the past week. Equitable Oil & Gas Co.'s No. 1 Scott, SW NE NW SW Section 15-1s-3e, was abandoned at 1,500 feet in Arbuckle lime, topped at 714 feet.

C. P. Williams and others' No. 1 Singletery, SE SW NW Section 25-2s-3e, was abandoned at 758 feet in lime.

Atoka County

Atoka County had a new wildcat test to start up during the past week, making three wildcats now going in that county. Clark and others' No. 1 Morrison, SE cor. Section 32-1-14, was spudding at 80 feet.

Kansas Wildcats

(Continued from Page 166)

Shell Pet. Corp.'s No. 1 Wenger, NE cor. Sec. 2-20-1w.
Base Mississippi lime 3,116 ft.; coring 3,335 ft.

Stafford et al's No. 1 Krehbiel, NW NW SE Sec. 27-21-3w; (O.W.D.D.).
C.O. at 2,080 ft. and S.D.

NESS COUNTY

Phillips Pet. Co.'s No. 1 Young, C NW SW Sec. 13-18-21w.
T.D. 3,035 ft.; lost circulation.

Texas Co. and Gypsy Oil Co.'s No. 1 Goodman, C SW SW Sec. 21-19-23w.
Siliceous lime 4,788 ft.; drlg. 4,955 ft.

OSAGE COUNTY

Jim Edwards' No. 1 Detrick, C NW SE Sec. 21-14-15.
T.D. 630 ft.; S.D.

Jim Edwards' No. 1 Detrick, C NW NE Sec. 21-14-15.
S.D. 630 ft.

PAWNEE COUNTY

Atlantic Oil Prod. Co.'s No. 1 Slepake, C NE NE Sec. 15-23s-17w.
Rigging up.

RENO COUNTY

Bradley's No. 1 Olmsted, SW SW SW Sec. 22-22-7w.
Moving in material.

Foraker et al's No. 1 Hiett, SE SW NE Sec. 34-24-4w.
T.D. 1,285 ft.; S.D.

Johnson & Carey et al's No. 1 Dyck, SE NE SE Sec. 35-22-5w.
Siliceous lime 4,064-70 ft.; H.F.W.

Privett Drlg. Co.'s No. 1 Crotts, NE NW NE Sec. 27-26-10w.
Set 6-in. 3,741 ft.; chat 3,981 ft.; base lime 4,050 ft.; show oil and wtr.; drlg. 4,218 ft.

RICE COUNTY

Allison & Fitzwilliams et al's No. 1 Stumps, NW NW SW Sec. 4-18-10w.
K.C. lime 2,950 ft.; drlg. 3,158 ft.

Day et al's No. 1 Mason, NW NE NE Sec. 28-21-7w.
Rigging up.

Foraker, Nickerson et al's No. 1 Lyons, SE NW Sec. 27-20-8w.
K.C. lime 2,916 ft.; H.F.W. 3,030-35 ft.; show oil and gas 3,100-05 ft.; drlg. 3,125 ft.

Gypsy Oil Co.'s No. 1 Koesling, NW NW SW Sec. 10-20-9w.
Set 5-in. csg. 3,240 ft.; Siliceous 3,239-61 ft.; swb. 3 bbls. oil per hr.; acidized and shut in.

Vickers Pet. Co. et al's No. 1 Gouldner, SE NE NW Sec. 16-18-9w.
S.D. 1,650 ft.

ROOKS COUNTY

Smith & Ash's (Carman & Hershey) No. 1 Nelson, NW NW NE Sec. 27-10-16w.
Rigging up.

Stearns & Streeter's No. 1 Hoskins, SE SW SE Sec. 34-9-16w.
Acidized; pumped 120 bbls. oil from Oswald lime 3,034-3,106 ft.; pumping 25 bbls. oil daily; R.U. to deepen.

Trees Oil Co. and Findeiss' No. 1 Johnson, SW SW SE Sec. 26-10-19w.
Rigging up.

RUSH COUNTY

P. Boyle et al's No. 1 Yost, C SW SW Sec. 23-17-18w.
Building rig.

Carlo O. & G. Co. and Phillips Pet. Co.'s No. 1 Benbow, NW NE NE Sec. 13-17-19w
Drlg. 3,780 ft.

Morgan & Flynn's No. 1 Schlegel, SE SE NW Sec. 26-17-16w.
Drlg. 660 ft.

RUSSELL COUNTY

J. Brouk and R. D. Bailey's No. 1 Kluesner, NW SE Sec. 34-15-12w.
Rigged up.

Hartman & Blair's No. 1 Furthemyer, NE cor. Sec. 1-14-14w.
Oswald 3,008 ft.; drlg. 3,238 ft.

Hartman & Blair's No. 1 Garrett, SW SW NW Sec. 24-13-12w.
Moving in material.

Hartman & Blair's No. 1 Krause, NE NW NW Sec. 5-15-15w.
Conglomerate 3,410 ft.; H.F.W. at 3,468 ft.; T.D.; S.D.
Oswald and 6-in. csg. at 3,171 ft.; drlg. 3,204 ft.

Hartman & Blair's No. 1 Hildebrandt, NW NE SW Sec. 12-14-14w.
Drlg. 1,475 ft.

Murphin et al's No. 1 Funk, SW cor. Sec. 19-12-13w.
Drlg. 2,583 ft.

Ryan Pet. Co.'s No. 1 Newbold, NW SE NE Sec. 25-12-15w.
Drlg. 275 ft.

Vernon & Murphin's No. 1 Becker, NE cor. Sec. 32-15-13w.
Rig.

Winkler & Koch's No. 1 Herman, SE NW Sec. 27-12-15w.
Location.

Wolf Creek Oil Co.'s No. 1 Kraft, SW cor. Sec. 26-16-11w.
T.D. 735 ft.; running 12-in. csg.
Drlg. 2,250 ft.

Wolf Creek Oil Co. et al's No. 1 Penn Mutual, SW cor. Sec. 22-16-15w.
Spudding.

SALINE COUNTY

Dieter et al's No. 1 Herrington, NE NW SE Sec. 3-13-1w.
Hunton lime 2,300 ft.; show oil and H.F.W. 3,105-25 ft., T.D.; U.R. 6-in. csg.

SEDGWICK COUNTY

Allison & Fitzwilliams et al's No. 1 Struthers, NE SW Sec. 34-28-2w.
H.F.W. 3,176-87 ft.; T.D. 3,295 ft.; fishing.

Magnolia Pet. Co.'s No. 1 Bartholomew, SE SE SW Sec. 30-27-4w.
Chat 3,682 ft.; 9-in. 3,692 ft.; standardizing.

SCOTT COUNTY

Atlantic Oil Prod. Co.'s No. 1 Mark "A," C SE SE Sec. 28-20-33w.
Rig.

STAFFORD COUNTY

Lario O. & G. Co.'s No. 1 Tudormorgan, SE SE NW Sec. 22-24-13w.
K.C. lime 3,508 ft.; cored 3,588-93 ft.; S.O.

SUMNER COUNTY

T. Palmer's No. 1 Wentworth, NW NW NE Sec. 9-35-2.
Drlg. 3,568 ft.

Tom Palmer's No. 1 Wentworth, NW NW NE Sec. 9-35-2.
Shot with 15 qts. at 3,412-17 ft.; pumped 60 bbls. oil, 2 bbls. wtr.; T.D. 3,475 ft.; fishing.

Shell Pet. Corp.'s No. 1 Green, SE SW NW Sec. 3-33-2.
Drlg. 1,555 ft.

Wakefield et al's No. 1 Newton, SE cor. Sec. 21-30-2.
Rig.

D. J. Wilson et al's No. 1 Clark, 1,320 ft. from W and 25 ft. from S line of NW Sec. 15-35-1w.
Rigging up.

TREGO COUNTY

Central Commercial's No. 1 Wagg, NW NW SE Sec. 17-13-21w.
T.D. 1,600 ft.; fishing.

Hansa & Lauck's No. 1 Lang, SE SE NW Sec. 1-14-21w.
Cellar.

Jenmar Oil Co.'s No. 1 Jones, SE cor. Sec. 20-12-23w.
Oswald lime 3,790 ft.; T.D. 3,880 ft.; 7-in. csg. 3,861 ft.; W.O.C.S.

WOODSON COUNTY

Kite et al's No. 1 Gorman, NE NW Sec. 18-25-14e.
Drlg. 630 ft.

Gulf Coast Wildcats

(Continued from Page 162)

ment Co., C of Lot 57, H.&T.C. Sur.
Drlg. shale and lime 4,500 ft.

Gulf Prod. Co.'s No. 1 T. L. Ellis, 330 ft. each way out of S cor. of 80-ac. lease, H. Little Sur.
Coring sandy shale 5,300 ft.

J. W. Sorrells' No. 1 Swift, Blk. 21, Abst. 318, H. N. Little Sur.
Derrick.

Sterling O. & R. Co.'s No. 1 W. A. Gamble, 300 ft. from E line and center N and S of Lot 78, E. Little Sur.
Drlg. shale 4,450 ft.

B. H. Stone's No. 1 H. McCauley, 350 ft. from E line, 300 ft. from S line of Lot 2, A.C.H.&B. Sur.
7-in. csg. 3,970 ft.; tested S.W.; pulling screen to reset.

Texas Co.'s No. 11-A Belcher, 990 ft. W and 330 ft. N of SE cor. of H. N. Little Sur.
Rig up.

Texas Co.'s No. 9 Houston Oil Field Assn., 263 ft. N of SW line and 330 ft. NW of SE line, Blk. 1, A.C.H.&B. Sur.
10-in. csg. 1,130 ft.; T.D. 1,135 ft.

Texas Co.'s No. 1 C. P. Dawson, 2,475 ft. S, 441.9 ft. W of NE cor. of Lot 59, H.T.&B. Sur. No. 23.
T.D. 5,645 ft.; 7-in. csg. 5,627 ft.; waiting on orders.

Texas Co.'s No. 3 A.R.G.G.H. Co., in C of Lot 37, H.&T.C. Sur. No. 23.
T.D. 4,045 ft.; 7-in. csg. 4,025 ft.

Texas Co.'s No. 17 Houston Oil Fields Assn., 244 ft. S, 244 ft. W, from NE cor. of Lot 1, A.C.H.&B. Sur. No. 91.
Location.

Texas Co.'s No. 16 Houston Oil Fields Assn., 247 ft. S, 440 ft. E from NW cor. of Lot 19, A.C.H.&B. Sur., No. 91.
Location.

Texas Co.'s No. 2 Dawson, 247 ft. S, 241 ft. W of NE cor. of Lot 58, H.T.&B. Sur. No. 23.
Location.

Texas Co.'s No. 1 L. C. Dawson, 247 ft. S, 441 ft. W of NE cor. of Lot 49, H.T.&B. Sur. No. 23.
Drlg. shale and lime 3,319 ft.

Texas Co.'s No. 2 Dawson, 247 ft. S, 441 ft. W of NE cor. Lot 48, H.T.&B. Sur. No. 23.
10-in. csg. 1,130 ft.; drlg. shale and lime 4,417 ft.

Texas Co.'s No. 3 F. Lieder, 247.5 ft. S and 247.5 ft. E of NW cor. of Lot No. 3, A.C.H.&B. Sur.
Rig up.

Trumba Oil Co.'s (J. M. Campbell) No. 1 H. McCauley, 150 ft. each way out of NE cor. of W 5 acres of Lot No. 2, A.C. H.&B. Sur. No. 91.
Location.

Windsor Oil Co.'s No. 2 Colby, 660 ft. SW of No. 1, center of tract N and S Tract 20, T. Spraggins Sur.
Cmtd. 7-in. csg. at 5,087 ft.

PLEDGER—BRAZORIA COUNTY

Humble O. & R. Co.'s No. 1 T. L. Smith, 1,283 ft. NE from W cor. of 88.86-ac. lease, thence 887 ft. SE at R/A, D. McNeel Sur.
Rig up.

STRATTON RIDGE—BRAZORIA COUNTY

Amerada Pet. Corp.'s No. 1 Seider & State, 225 ft. due N of No. 3.
Fishing 4,755 ft.

Thompson Drlg. Co.'s No. 1 Seaburn Est., Austin & Williams one-half league.
T.D. 4,770 ft.; stuck drill pipe at 4,300 ft.; sidetracking.

WEST COLUMBIA—BRAZORIA COUNTY

Sterling O. & R. Co.'s No. 4 Hogg, 200 ft. S of No. 1, 50 ft. from W line of lease, Martin Verner Sur.
T.D. 5,298 ft.; cmt. back to 4,850 ft.; drilled out cmt. to 5,190 ft.; S.D.

Texas Co.'s No. 84 Hogg, 2,483 ft. N, 50 ft. W from SE cor. of lease, M. Varner Sur.
Temporarily S.D. 5,242 ft.

ANA HUAC—CHAMBERS COUNTY

Humble O. & R. Co.'s No. 1 J. J. Clark, 466 ft. N of S line and 466 ft. W of E line of H.&T.C. Sur., Sec. 64.
Moving in rig.

Humble O. & R. Co.'s No. 2 Middleton, 466 ft. out of NE cor. of H.&T.C. Sur., Sec. 64.
Building derrick.

BARBERS HILL—CHAMBERS COUNTY

Humble O. & R. Co.'s No. 8-B Kirby, 200 ft. N of No. 2, 100 ft. W of E line, Henry Griffith League.
Running 9⅝-in. csg. 4,748 ft.; top sand 4,733 ft.

McAlbert Oil Co.'s No. 3-B Heggins, 50 ft.

S of N line and 50 ft. E of W line.
Drlg. salt 1,836 ft.
Sun Oil Co.'s No. 15 Wilburn, 405 ft. from E and 50 ft. from W line of lease, Wm. Hodges Sur.
7-in. csg. 5,475 ft.; T.D. 5,585 ft.
Sun Oil Co.'s No. 17 Wilburn fee, 188 ft. E of W line and 40 ft. S of N line and 126 ft. W of No. 16.
Swabbing; T.D. 3,195 ft.
Texas Gulf Prod. Co.'s No. 3 Fitz, 450 ft. E of W line, 75 ft. N of S line.
Drlg. gumbo 290 ft.
Texas Gulf Prod. Co.'s No. 12-A Kirby, 613 ft. N of S line, 85 ft. W of E line, W of Humble O. & R. Co.'s No. 8-B Kirby.
Drlg. rock 2,561 ft.
Texas Gulf Prod. Co.'s No. 2 Morgan Fitzgerald, 400 ft. N of S line, C of Strip No. 3.
Drlg. shale and lime 5,683 ft.
Texas Gulf Prod. Co.'s No. 2 Fitz-Meadows, 281 ft. S of N line, 50 ft. W of E line of Lot of T. S. Fitz lot.
18⅝-in. csg. on bottom 1,124 ft.
Yount Lee Oil Co.'s No. 28 Chambers County, 50 ft. N of S line, direct offset to Sun's No. 10 Chambers County Wm. Bloodgood Sur.
Drlg. salt 2,292 ft.

BIG CREEK—FORT BEND COUNTY

Trans-State Oil Co.'s No. 2 Ahlers, 85 ft. N of Gulf Stream, Inc.'s No. 1 Ahlers, Michael Young Sur.
Drlg. 510 ft.

BOLING—FORT BEND COUNTY

Allied Minerals, Inc.'s No. 1 E. C. Farmer, James Scott League, 750 ft. SE of NW line and 150 ft. SW of NE line of Gulf Prod. Co.'s E. C. Farmer 50-ac. tract. Replugging the hole.
Irwin Larsen et al's No. 1 J. R. Farmer, 100 ft. NW and 100 ft. SW from E cor. of 125-ac. lease, James Scott Sur.
Location.
Midland Oil Co.'s No. 1 P. F. Coulter, 150 ft. from S line, 4,174 ft. from W line of 100-ac. tract, Miller League No. 2.
Set screen; T.D. 4,186 ft.
Navarro Oil Co.'s No. 1 H. R. Farmer, 800 ft. from SW line and 100 ft. from SE line of 168-ac. tract in James Scott Sur.
T.D. 4,297 ft.; 7-in. at 4,012 ft.; P.B. to 3,985 ft.; perforated csg. from 3,840-88 ft.; I.P. 10 bbls. per hr.; tubing pressure 200 lbs.
Trans-State Oil Co.'s No. 1 Dipple, 480 ft. from NW and 347 ft. from SW lines of 38-ac. tract, E flank of dome.
Drlg. shale 4,110 ft.

ORCHARD—FORT BEND COUNTY

Gulf Prod. Co.'s No. 42 Moore, 345 ft. S. 305 ft. W of SW cor. of E.M.G. Co. Sur.
Drlg. shale 2,010 ft.
Gulf Prod. Co.'s No. 43 Moore, 350 ft. E along S line of SW cor. of E.M.&G. Co. Sur. and 740 ft. N at R/A to said line of lease, 350 ft. E of No. 3 Moore.
Rig up.

THOMPSON—FORT BEND COUNTY

Gulf Prod. Co.'s No. 1-B Gehr, 340 ft. from S line of lease, 640 ft. E of Naylor Oil Co.'s No. 7 Gehr, L. Kennedy Sur.
Drlg. shale and lime 4,950 ft.
Gulf Prod. Co.'s No. 1 F. I. Booth, 2,777 ft. from L line and 340 ft. from SE cor. of 202-ac. tract, H. Cristman Sur.
T.D. 5,400 ft.; top sand 5,336 ft.; I.P. 40 to 50 bbls. daily.
Gulf Prod. Co. and Humble O. & R. Co.'s No. 24-A Booth, 486 ft. from N line of 1,107-ac. lease and 898 ft. W of No. 22-A, S. Kennedy Sur.
Location.

HIGH ISLAND—GALVESTON COUNTY

Yount Lee Oil Co.'s No. 45 Cade.
Drlg. sand and lime 4,658 ft.
Yount Lee Oil Co.'s No. 1-A Gordon-Viterbo, 122 ft. E of W line, 326 ft. S of N line of Lot 1, Martin Dunman Sur.
Drlg. sand and lime 3,182 ft.
Yount Lee Oil Co.'s No. 1 Loustalbot, 300 ft. from N line, 121 ft. from E line of Lot No. 3, offset to No. 2 Stewart, Martin Dunman Sur.
Drlg. rock 2,784 ft.
Yount Lee Oil Co.'s No. 1 F. C. Pabst, 1,186 ft. S of N line and 1,186 ft. E of W line of Lot 32, Martin Dunman Sur.
Coring sand 4,782 ft.

DICKINSON—GALVESTON COUNTY

Humble O. & R. Co.'s No. 3-A Stewart, 338 ft. S of easterly NE cor., 2,016 ft. W of easterly E line, 425 ft. S of S line of Bayou, John Sellers Sur.
16-in. csg. 212 ft.; drlg. shale and boulders 1,860 ft.
Humble O. & R. Co.'s No. 2-A Maco Stewart, 3,324 ft. S along E line of S bank of Bayou and 566 ft. W of E line at R/A, John Sellers Sur.
Rig up.
Humble O. & R. Co.'s No. 1 Schaper, C 8¾ of Blk. 15, or on line between Lots 3 and 4 and center N and S. W. K. Wilson Sur.
Coring sandy shale 8,736 ft.
Humble O. & R. Co.'s No. 1 A. F. Danielson, C of 20-ac. tract, Lots 5 and 6, C. A. Anderson Subd. of Lot 15, of the Righter Subd., John Sellers Sur.
T.D. 9,127 ft.; 7-in. csg. at 9,070 ft.

ARRIOLA—HARDIN COUNTY

Houston Oil Co. and Republic Prod. Co.'s No. 5-X fee, E Arriola Sur.
Drlg. shale and lime 3,211 ft.
Republic Prod. Co's No. 11 fee, E. Arriola Sur.
Fishing; T.D. 2,883 ft.

BATSON—HARDIN COUNTY

Sterling O. & R. Co.'s No. 1 Doucette, 565 ft. N from NE cor. of Nunn tract thence 565 ft. E at R/A, Wm. Donoho Sur.
Rig up.
John Deering's No. 1 Bullock, 1,000 ft. N, 17 ft. E of middle line of 30-ac. tract, Bullock tract, Dondo Sur.
10¾-in. csg. 750 ft.; drlg. 786 ft.
John Deering's No. 2 Hooks.
Drlg. shale 2,010 ft.
John Deering's No. 2 Cruse, 200 ft. E and 50 ft. S of No. 1 Cruse, W. Donaho Sur.
Rig up.

SARATOGA—HARDIN COUNTY

Rio Bravo Oil Co.'s No. 11-N Jordit, 200 ft. due W of No. 11-R Jordit.
Clearing location.

SOUR LAKE—HARDIN COUNTY

Arlis Pet. Co.'s No. 1 Harkan and Langham.
Dig pits.
Alpha Pet. Co.'s No. 2-A Wm. Weiss, 100 ft. W of No. 2.
T.D. 6,808 ft.; set 5 9/16-in. drill pipe at 6,760 ft.; perforated csg. from 6,751-60 ft.; flowing 10 bbls. per day by heads; may abd.
Texas Co.'s No. 318 fee, midway between No. 265 and 274.
T.D. 1,856 ft.; P.B. to 1,556 ft.

HUMBLE—HARRIS COUNTY

Sun Oil Co.'s No. 73 River, 2,757 ft. N of S line and 175 ft. E of W line of 292-ac. lease, Robert Dunman Sur.
Rig up.
Sun Oil Co.'s No. 29 Bender.
Rig up.

GOOSE CREEK—HARRIS COUNTY

Humble O. & R. Co.'s No. 80 Simms-Smith Scott Lower League, 1,000 ft. E of the most westerly W line, and 300 ft. N of the most northerly S line.
T.D. 6,254 ft.; P.B. to 6,222 ft.; abd.

PIERCE JUNCTION—HARRIS COUNTY

Gulf Prod. Co.'s No. 38 Taylor.
Drlg. shale 4,010 ft.
Rio Bravo Oil Co.'s No. 27-A Settegast, 377 ft. S, 553 ft. W of NE cor. of Settegast "A" tract, James Hamilton Sur.
Standing 5,526 ft.
Rio Bravo Oil Corp.'s No. 9-A Settegast, 1,575 ft. N line, 350 ft. E line NE cor. "A" lease, J. A. Kopman Sur.
T.D. 5,411 ft.; standing.

MYKAWA—HARRIS COUNTY

J. W. Falvey's No. 2 Minnetex, 150 ft. from S line and 87.5 ft. from E line of Blk. 192, Wm. Lovett Sur.
Testing.
West Prod. Co.'s No. 1 Cora Holmes, C of 10ac. tract, A. J. Rothas Sur., Blk. 11.
Testing.
West Prod. Co.'s No. 1 T. F. Reed, 403 ft. from E line and 270 ft. from N line of lease, F. J. Rothas Sur., Abstract 667, Blk. 8.
Drlg. shale 2,610 ft.

TOMBALL—HARRIS COUNTY

Amerada-Stanolind O. & G. Co.'s No. 1 H. G. Felber, Elizabeth Smith Sur.
Washing in 5,571 ft.
Humble O. & R. Co.'s No. 1 Schultz, 550 ft. from S line, 356 ft. from W line of 42.05-ac. tract, J. House Sur.
10¾-in. csg. at 931 ft.
Humble O. & R. Co.'s No. 1 Tom Ball townsite, Unit No. 1, 25 ft. from SW line, 25 ft. from NE line of Lot No. 1, Blk. 23, Wm. Hurd Sur.
Location.
Humble O. & R. Co.'s No. 2 Gossett, 363 ft. from NW line, 328 ft. from SW line, E. Smith Sur.
Top sand 5,551 ft.; reaming 5,558 ft.
Humble O. & R. Co.'s No. 5-A Quilter, 980 ft. from S line, 466 ft. from W line of 300-ac. tract, A. Senchel Sur.
Drlg. shale 3,160 ft.; 10¾-in. csg. at 926 ft.
Humble O. & R. Co.'s No. 1 Scherer, 224 ft. from E line, 300 ft. N of line projected W through Shell Pet. Corp.'s No. 1-A Theis, J. House Sur.
Coring sand 5,578 ft.
Humble O. & R. Co.'s No. 1 Stallones, 505 ft. from E line, 365 ft. from N line, J. Hooper Sur.
Drlg. shale 3,936 ft.
Humble O. & R. Co. et al's No. 3 Rudel, 1,750 ft. N of S line, 185 ft. E of W line of 90-ac. tract, J. House Sur.
Top sand 5,587 ft.; T.D. 5,600 ft.; 7-in. csg. 5,593 ft.; I.P. 17 bbls. per hr. through ¼-in. choke; tubing pressure 700 lbs.; csg. pressure 1,285 lbs.
Texas Co.'s No. 3 Ziegler, 1,449 ft. E of W line and 446 ft. S of N line of lease, 930 ft. E of No. 1.
Drlg. shale and lime 3,258 ft.

KITTRELL—HOUSTON AND WALKER COUNTIES

Humble O. & R. Co.'s No. 8 Shaw, 330 ft. from SE line, 420 ft. from SW line, C. McEllis Sur.
Top sand 1,970 ft.; 7-in. csg. 1,969 ft.; T.D. 2,000 ft.
Sun Oil Co.'s No. 3 Huffman, C. McEllis Sur.
Rig up.
Sun Oil Co.'s No. 2 Huffman, 660 ft. NW of No. 1, Charles McEllis Sur.
T.D. 1,995 ft.; I.P. 121 bbls. in 12 hrs. through 5/16-in. choke; csg. pressure 500 lbs.; tubing pressure 300 lbs.

VANDERBILT—JACKSON COUNTY

Imperator Oil Co.'s No. 1 Dutton, S C of Lot No. 11, Blk. 25, 450 ft. S of R.R. and 1,350 ft. W line of townsite, Ray Musquiz Sur.
Rigged up and S.D.
Turman Oil Co.'s No. 1 T. H. Miller, 150 ft. each way out of E 50 ac. of Miller 100-ac. tract in Ray Musquiz Sur.
Rigging up.

BIG HILL—JEFFERSON COUNTY

Yount Lee Oil Co.'s No. 1-A Pipkin, 2,640 ft. S and 2,050 ft. W of NE cor. of survey.
T.D. 6,279 ft.; milled 7-in. csg. 5,831 ft.; drlg. shale 6,130 ft.

FANNETT—JEFFERSON COUNTY

Gulf Prod. Co.'s No. 8 Burrell, 750 ft. N from SW. cor. of C. W. Burrell's 232-ac. tract and 100 ft E at R/A.
Moving in material.

CLEVELAND—LIBERTY COUNTY

Black Gold Pet. Oil Corp.'s No. 2 R. D. McDonald, 466 ft. W of most westerly E line and 466 ft. N of most northerly S line of survey, 933 ft. W of Gulf Prod. Co.'s No. 7-C Kirby Lbr. Co., T. Devers Sur.
Derrick.
William J. Colegrove et al's No. 1 State School Land & Dev. Co., 446 ft. from W line and 170 ft. from S line of survey, Clayton Harper Sur.
Location.
Gulf Prod. Co.'s No. 1 R. D. McDonald, 467 ft. from N and E lines of lease and survey, Chas. Smith Sur.
Coring shale 4,830 ft.

ESPERSON—LIBERTY COUNTY

General Crude Oil Co.'s No. 21 Esperson.
T.D. 4,327 ft.; top oil sand 3,928 ft.
General Crude Oil Co.'s No. 1 W. D. Kay Malcolm Duncan Sur., 1,537 ft. along N Reaming to bottom 6,655 ft.
General Crude Oil Co.'s No. 10 Davis, 2,000 ft. from E line, 660 ft. from S line of D. Kokernut Sur.
Coring 5,726 ft.; show of oil.

HANKAMER—LIBERTY COUNTY

Cretaceous Oil Co.'s No. 2 S. E. Exzell, 150 ft. S of N line, 100 ft. W of E line of Exzell's 75-ac. tract, Levi Barrow Sur.
Drlg. 1,530 ft.
Eljean Oil Co.'s No. 1 Exzell, 1,325 ft. from N, 150 ft. from E line of Exzell 175-ac. tract.
Rig up.
Gulf Prod. Co.'s No. 1 Hankomer, 300 ft. W, 420 ft. N of SE corner of George Stringler Survey.
Drlg. shale 2,759 ft.
Jones Drlg. Co.'s No. 1 Exzell, 1,050 ft. S of N line, 150 ft. W of E line of Levi Barrow Sur.
Rig up.
Will Strozier et al's No. 1 Exzell, 700 ft. N of S line, 150 ft. W of E line of Levi Barrow Sur.
Derrick.
Wilson-Broach Oil Co.'s No. 1 Barrow, 150 ft. N of S line, 100 ft. W of E line, W. M. Crook et al. Levi Barrow Sur.
Prepare to make D.S. test; T.D. 2,767 ft.

HULL—LIBERTY COUNTY

G. R. Brown and S. F. Bashara's No. 1 David Hannah, Jesse Devore league, 300 ft. S line, 150 ft. E line, 42-ac. Gulf tract.
Derrick.
Republic Prod. Co.'s No. 145 Dolbear, Jesse Devore.
Drlg. shale 2,710 ft.
Republic Prod. Co.'s No. 155 Dolbear, Jesse Devore Sur.
Rig up.
Gulf Prod. Co.'s No. 107 Phoenix, 400 ft. W of No. 106, and 400 ft. N of No. 103, J. Devore Sur.
Rig up.
Texas Co.'s No. 3 Barrow.
6⅝-in. csg. 3,319 ft.; S.D. 4,365 ft.

MOSS BLUFF—LIBERTY COUNTY

Gulf Coast Sulphur Co.'s No. 1 McManus, 588 ft. from E, 1,650 ft. from N line of W. A. tract, B. M. Spinks Sur.
Location.

CONROE—MONTGOMERY COUNTY

Humble O. & R. Co.'s No. 6 Pfaefflin, 413 ft. N of No. 1, 633 ft. from W line of lease, Wm. Real Sur.
T.D. 5,122 ft.; 7-in. csg. at 5,121 ft.
Houston Oil Co.'s No. 12 Cartwright, 932 ft. E of No. 11, 933 ft. N of No. 9.
Drlg. shale 1,513 ft.
Sun Oil Co.'s No. 22 Foster, J. Brecker Sur.
Cored gas sand 4,975-95 ft.; coring shale 5,070 ft.

SPLENDORA—MONTGOMERY COUNTY

Bryce McCandless et al's No. 1 Texas Long Leaf Lbr. Co., 330 ft. from N and E lines of the W½ of Blk. No. 8, Walker County School Land Sur.
Derrick.

ORANGE—ORANGE COUNTY

Trio Oil Co.'s No. 1 D. S. Comier, 69 ft. W of E line and 39 ft. S of N line of 6.83-ac. tract in W. M. Dyson Sur.
S.D. 2,720 ft.

TOM O'CONNOR—REFUGIO COUNTY

Quintana Oil Co.'s No. 7-A O'Connor, 1,400 ft. SE of section, 4,199 ft. from SE line of survey.
Tested 5,800 ft. oil; T.D. 5,837 ft.; to set csg.
Quintana Oil Co.'s No. 2-B O'Connor, 500 ft. from W line, 260 ft. from S line of M. L. White Sur.
T.D. 3,762 ft.
Quintana Oil Co.'s No. 6-A O'Connor, J. M. Swisher Sur., Blk. 4.
Prepare to spud.

PORT NECHES—ORANGE COUNTY

Port Neches Pet. Corp. et al's No. 1 W. B. Organ, 450 ft. from NE line and 150 ft. from NW line of A. Schramm Sur., S of Port Neches Field.
Drlg. shale 5,102 ft.
Texas Co.'s No. 3-B Polk, 200 ft. S, 450 ft. W of SE cor. of Mary E. Hall Sur. No. 8.
T.D. 5,938 ft.; pulled in derrick.
Texas Co.'s No. 2 Orange National Bank, 750 ft. S of N line and 295 ft. E of W line of lease, Jacob Beaumont Sur.
Drlg. lime 5,680 ft.
Texas Co.'s No. 4-B Polk, 750 ft. S and 1,450 ft. W from NE cor. of lease, Jacob Beaumont Sur.
Location.
Texas Co.'s No. 5-B Polk, 750 ft. S and 950 ft. W from NE cor. of lease, Jacob Beaumont Sur.
Location.
Texas Co.'s No. 6-B Polk, 750 ft. S and 350 ft. W from NE cor. of lease, Jacob Beaumont Sur.
Location.

LIVINGSTON—POLK COUNTY

C. & C. Drlg. Co. et al's No. 1 E. A. Watts, 330 ft. NS line, and midway between E and W lines of 124-ac. tract, A. Viesca Sur.
Drlg. shale 3,005 ft.
Gem Oil Co.'s No. 6 Davis & Holmes, 481 ft. from W and 662 ft. from N line of survey, A. Viesca Sur.
Rig up.
Werby and Refugio Oil Corp.'s No. 5 Dick & Failing, 330 ft. E of W line of tract, 550 ft. N of No. 1, A. Viesca Sur.
Rig up.
J. Z. Werby and Shell Pet. Corp.'s No. 4 Dick & Failing, 660 ft. NW of No. 3, 660 ft. from W line, A. Viesca Sur.
T.D. 4,259 ft.; I.P. 328 bbls. per day on production test; tubing pressure 940 lbs.; csg. pressure 1,200 lbs.

SAN FELIPE—WALLER COUNTY

Buck Oil Co.'s No. 1 Vaughn, 660 ft. due E of Seaporton Co.'s No. 1 Vaughn, J. McFarland Sur.
Location.

GRETA—REFUGIO COUNTY

Hewitt & Daugherty, 466 ft. from N line, 506 ft. from E line of Hardwick Sur.
Derrick.
Hewitt & Daugherty's No. 12 Lambert.
Rig up.
Humble O. & R. Co.'s No. 19 Heard, 466 ft. from N line, 466 ft. from W line of John Peoples Sur.
10¾-in. csg. at 1,211 ft.; tested 80 ft. of oily mud and built up 350 lbs. pressure on D.S. test; T.D. 4,404 ft.
Humble O. & R. Co.'s No. 1 Marberry, 4,558 ft. from S line, 466 ft. from W line of John Denn Sur.
13⅜-in. csg. at 1,015 ft.; drlg. shale 1,062 ft.
Stanolind O. & G. Co.'s No. 5 O'Connor.
Derrick.
Standard Oil Co. of Kansas.
Derrick.

REFUGIO—REFUGIO COUNTY

Houston Oil Co.'s No. 20 P. H. Rooke, 385 ft. NE of SW line, 137 ft. E of No. 16.
7-in. csg. at 4,900 ft.; T.D. 4,906 ft.
Houston Oil Co.'s No. 21 P. H. Rooke, Thomas Mullen grant, 990 ft. from E line, 697 ft. SW from No. 18.
Drlg. shale 3,710 ft.
Houston Oil Co.'s No. 22 P. H. Rooke, 660 ft. from No. 19, 690 ft. from No. 20.
Derrick.
Houston Oil Co.'s No. 23 Rooke, 660 ft. W of No. 19.
Location.
United Gas Co.'s No. 16 Lambert.
Drlg. shale 3,810 ft.
United Gas Co.'s No. 18 Lambert.
Drlg. shale 2,910 ft.
United Gas Co.'s No. 19 Lambert.
Drlg. plug 1,236 ft.
United Gas Co.'s No. 17 Lambert.
Drlg. shale 3,510 ft.

COLLETTO CREEK—VICTORIA COUNTY

American Liberty Oil Co.'s No. 2 Prybil, S of No. 1.
T.D. 2,800 ft.; I.P. 14 bbls. per hr.
Cox & Hooper's No. 2 Zimmer, 330 ft. from NW and SW lines of 125-ac. tract, Manchola Sur.
Drlg. shale 1,320 ft.

CLAY CREEK—WASHINGTON COUNTY

Sun Oil Co.'s No. 32 Smith.
Rig up.

McFADDIN-O'CONNOR DISTRICTS—VICTORIA AND REFUGIO COUNTIES

Texas Co.'s No. 9 McFaddin, 1,850 ft. N, 2 deg., 45 ft. S from No. 2.
20-in. csg. 87 ft.; T.D. 166 ft.

LOUISE—WHARTON COUNTY

Pure Oil Co.'s No. 1 John Macha, 318 ft. from NW line and from SE line of F. Walnut Sur., and 467 ft. from NE line of 101.53-ac. lease, M.&C. Sur. No. 35.
Derrick.
Pure Oil Co.'s No. 1 G. Wharton Est., 1,497 ft. from SW line and 318 ft. from SE line of F. Walnut Sur., Abst. A-35.
Sidetracking 3,247 ft.
Pure Oil Co.'s No. 3 Stewart, 1,000 ft. SW and 318.25 ft. SE from N cor. of W. L. Stewart's 160-ac. tract, Morris and Cummings Sur. No. 25.
Location.
Pure Oil Co.'s No. 4 Stewart, 485 ft. SW, 330 ft. NW of E cor. of W. L. Stewart's 160-ac. tract, Morris and Cummings Sur. No. 25.
Drlg. sand rock 5,021 ft.

BAY JUNOP—TERREBONNE PARISH

Texas Co.'s No. 6-B State, 458 ft. S, 498 ft. E of NW cor. of Sec. 34-21s-14e.
Drlg. shale 6,800 ft.

BAY ST. ELANE—TERREBONNE PARISH

Texas Co.'s No. 9 Bay St. Elane.
Drlg. 6,420 ft.

CALLIOU ISLAND—TERREBONNE PARISH

Texas Co.'s No. 17 Calliou Island, Sec. 30-23-23.
Rig up.
Texas Co.'s No. 18 Calliou Island.
Abd. 4,228 ft.

SOUTH LOUISIANA FIELDS

BLACK BAYOU—CAMERON PARISH

Shell Pet. Corp.'s No. 21 Watkins, 1,570 ft. E of NW cor. Sec. 17-12s-12w.
Drlg. shale 914 ft.
Shell Pet. Corp.'s No. 3 State.
T.D. 6,153 ft.; swabbing.

BOSCO—ACADIA AND ST. LANDRY PARISHES

Superior Oil Prod. Co.'s No. 1 Mire, "A" Lease, 3,611 ft. N, 1,895 ft. W of SE cor. of Sec. 33-8s-3w.
13⅜-in. csg. 1,248 ft.; drlg. sandy shale 7,018 ft.
Superior Oil Prod. Co.'s No. 2 Malancon, 2,665 ft. S, 1,757 ft. W of NE cor. of Sec. 33-8s-3e.
Drlg. shale 7,954 ft.
Superior Oil Prod. Co.'s No. 1 Iseringhauser, 1,395 ft. E, 330 ft. N of SW cor. of N½ of NW¼ of Sec. 35-8s-3e.
Drlg. shale 7,237 ft.
Superior Oil Prod. Co.'s No. 6 Hermandez, 1,900 ft. S and 643 ft. E of NW cor. of Sec. 34-8s-3e.
7-in. csg. 7,839 ft.; T.D. 7,849 ft.
Superior Oil Prod. Co.'s No. 2 Falls, 330 ft. N, 1,796 ft. W of SE cor. of Sec. 27-8s-3e.
13⅜-in. csg. at 1,235 ft.
Drlg. sand and shale 7,749 ft.
Superior Oil Prod. Co.'s No. 5 Comeaux, 2,375 ft. S, 1,062 ft. W of NE cor. Sec. 34-8s-3e.
T.D. 8,711 ft.; 7-in. csg. at 8,684 ft.
Superior Oil Prod. Co.'s No. 3 Arceneaux, 1,271 ft. S, 1,580 ft. W of NE cor. Sec.

33-8s-3e.
7-in. csg. cmtd.; T.D. 8,714 ft.
Superior Oil Prod. Co.'s No. 2 Johnson, 1,-158 ft. N, 473 ft. E from SW cor. of NE¼ Sec. 34.
7-in. csg. at 8,638 ft.; T.D. 8,663 ft.
Superior Oil Prod. Co.'s No. 1 Moise La-Vergne, 269.7 ft. W and 98 ft. N of SE cor. of Sec. 28-8s-3e.
7-in. csg. at 8,698 ft.; T.D. 8,719 ft.

DARROW—ASCENSION PARISH

Humble O. & R. Co.'s No. 5 Community, 328 ft. SW of NE line of section, 200 ft. at R/A to east bank of river, Sec. 33-10s-2e.
13⅜-in. csg. at 1,531 ft.; T.D. 1,532 ft.
Humble O. & R. Co.'s No. 4 Community, 4,825 ft. from NE cor. and 288 ft. S of N line at R/A, Sec. 33-10s-2w.
Digging cellar.

CAMERON MEADOWS—CAMERON PAR

Burton-Sutton Oil Co.'s No. 5 School Land, 150 ft. N of S line and 300 ft. E of No. 2, Sec. 16-14s-13w.
Bldg. derrick.
Burton-Sutton Oil Co.'s No. 4 School Land. 3,891 ft. W and 150 ft. N of SE cor. of Sec 16-4s13w.
Derrick.
Magnolia Pet. Co.'s No. 11 Cameron Meadows.
Digging canal.
Texas Co.'s No. 1 Miami Corp.
Drlg. shale 9,331 ft.
Texas Oil Co.'s No. 11 Calcasieu Lake.
Rig up.

CHOCTAW DOME—IBERVILLE PARISH

Standard Oil Co.'s No. 5 Gay, 2,450 ft. S and 425 ft. E of NW cor. of NE Sec. 32-9s-11e.
Drlg. wtr. sand 3,375 ft.

DOG LAKE—TERREBONNE PARISH

Texas Co.'s No. 8 Louisiana Land & Exploration.
T.D. 5,217 ft.; P.B. to 4,940 ft.; drilled to 5,000 ft.; sidetracked; drlg. shale 5,274 ft.
Texas Co.'s No. 11 State, 150 ft. N and 2,474 ft. W, SE cor. Sec. 31-21s-16e.
Derrick.

GARDEN ISLAND BAY—TERREBONNE PARISH

Texas Co.'s No. 13 State, 3,391 ft. S and 1,-504 ft. W of NE cor. Sec. 107-23-32.
Rig up.

GUEYDAN—VERMILLION PARISH

Pure Oil Co.'s No. 6, Alliance Trust, 667 ft. E, 1,787 ft. S line of lease, Sec. 34-11s-1w
Sidetracked at 3,527 ft.

HACKBERRY—CAMERON PARISH

Calcasieu Oil Co.'s No. 4 Hanzen, 1,680 ft. W and 780 ft. N of SE cor. Sec. 11-12s-10w.
Drlg. shale 7,318 ft.
Gulf Prod. Co.'s No. 17 Erwin.
Drlg. shale 5,510 ft.
Gulf Prod. Co.'s No. 14-B State, 610 ft. S. 1,866 ft. E of NE cor. Sec. 13-12s-10w.
Derrick.
Sutton Oil Co.'s No. 1 Ellender, 616 ft. S and 50 ft. E of NW cor. SW¼ SE¼ Sec. 23-12s-10w.
T.D. 3,231 ft.; I.P. pumping 40 bbls. of oil per day, 22% S.W.
Sutton Oil Co.'s No. 2 Portier, 717 ft. S and 50 ft. W of NW cor. SW¼ SE¼ Sec. 23-12s-10w.
Rig up.
Texas Co.'s No. 14 State, 500 ft. SE of No. 13, Sec. 13-12s-10w.
Derrick.
Yount Lee Oil Co.'s No. 1-A Gulf Land. 2,000 ft. S and 50 ft. E of the NW cor of Sec. 22-12-10.
Rig up.

NEW IBERIA—IBERIA PARISH

Harrison & Abercrombie's No. 3 Schwing. 500 ft. N and 50 ft. E of No. 2, Sec. 24-12s-5w.
T.D. 6,505 ft.; to P.B. to 3,000 ft.; trying to sidetrack.
T.D. 6,505 ft.; to P.B.
Iberia Oil Corp. and Y. D. Spell's No. 2 Bernard, 150 ft. E of No. 1, Sec. 54-12s-7e.
S.D. 3,846 ft.; salt.
Iberia Oil Co. and Y. D. Spell's No. 3 Bernard, 300 ft. N of No. 2, Sec. 54-12s-7e.
Drlg. shale 3,264 ft.
Texas Co.'s No. 1 Hanzen, NE along NW line of lease 508 ft., thence 150 ft. E at R/A, Sec. 54-12s-7e.
Abd.; heaving shale; T.D. 7,934 ft.

IOWA—CALCASIEU AND JEFF DAVIS

Shell Pet. Corp.'s No. 3 Ardoin.
Redrlg. hole 7,028 ft.
Shell Pet. Corp.'s No. 14 Heyd, 330 ft. N, 1,819 ft. W of SE cor. of NE¼ Sec. 13
T.D. 6,702 ft.; 7-in. csg. 6,623 ft.; re-running screen.
Shell Pet. Corp.'s No. 15 Heyd, Sec. 13-9s-7w.
Rig up.

JENNINGS—ACADIA PARISH

Absure-Bolyard Oil Co.'s No. 2 Clement.
S.D. 1,910 ft.
Port City Oil Co.'s No. 3 Syndicate.
T.D. 6,311 ft.
Port City Oil Co.'s No. 6 Syndicate.
Drlg. 1,610 ft.
Yount Lee Oil Co.'s No. 7 Houssiere-Latrielle.
R.U. to W.O.
Yount Lee Oil Co.'s No. 14 Housierre-Latrielle, 260 ft. N of No. 13, Sec. 47-9s-3w
Coring sand 7,730 ft.
Yount Lee Oil Co.'s No. 10 Housierre-Latrielle, 5,435 ft. due E, 1,070 ft. due N of SW cor. of section.
Abd. 7,805 ft.

LAKE BARRE—TERREBONNE PARISH

Texas Co.'s No. 19 Lake Barre.
T.D. 345 ft.
Texas Co.'s No. 25 Lake Barre.
S.D. 1,820 ft.
Texas Co.'s No. 14 Lake Barre.
D.S. stuck 2,999 ft.; P.B. and sidetracked; Drlg. lime 2,948 ft.
Texas Co.'s No. 15 Lake Barre.
Drlg. 2,407 ft.

LAKE PELTO—TERREBONNE PARISH

Texas Co.'s No. 12 Lake Pelto.
T.D. 6,990 ft.; P.B. to 4,630 ft.
Whitstone O. & G. Co.'s No. 1 Buckley, 300 ft. S and E of NW cor. SW SW Sec. 35-19s-16e.
T.D. 3,390 ft.; P.B. to 3,053 ft.; bailing.

LAKE HERMITAGE—PLAQUEMINES PARISH

Humble O. & R. Co.'s No. 3 Lafourche Levee Basin 1,725.
16-in. csg. 136 ft.; T.D. 206 ft.

LAKE WASHINGTON—PLAQUEMINES PARISH

Humble O. & R. Co.'s No. 23 Cockrell-Moran, 650 ft. N and 21 deg. 30 min. E of No. 2 in Twp. 20s-26e.
Drlg. mud 3,065 ft.

LEESVILLE—LAFOURCHE PARISH

Gulf Prod. Co.'s No. 10 Bernard, 1,833 ft. E, 958 ft. S of NW cor. Sec. 26-21s-22e.
Derrick.
Emerald Pet. Co.'s No. 10 State, west bank, 300 ft. S of well No. 1.
Location.
Emerald Pet. Co.'s No. 11 State, east bank. 227 ft. N of well No. 1.
Location.
Emerald Pet. Co.'s No. 12 State, east bank. 250 ft. S of well No. 1.
Location.
Lincoln Oil Co.'s No. 6 State.
Drlg. shale 3,226 ft.
Lincoln Oil Co.'s No. 5 State.
Location.
Texas Co.'s No. 31 Leesville.
T.D. 3,999 ft.
Texas Co.'s No. 23 Leesville.
Drlg. shale 2,735 ft.
Texas Co.'s No. 27 Leesville.
Derrick.
Texas Co.'s No. 30 Leesville, 1,075 ft. S, 310 ft. E. NW cor. Lot 6, Sec. 26-21s-22w.
T.D. 4,361 ft.; P.B. and drilled to 3,660 ft.; put on air lift.

LOCKPORT—CALCASIEU PARISH

Magnolia Pet. Co.'s No. 7 Farquar (W.O.).
Drlg. shale 6,065 ft.
Magnolia Pet. Co.'s No. 14 Miller (W.O.).
T.D. 4,389 ft.
Union Sulphur Co.'s No. 6 Moss, located between No. 2 and No. 5 (W.O.).
Milling out 6,263 ft.

PORT BARRE—ST. LANDRY PARISH

Gulf Prod. Co.'s No. 11 Wilson Cochran, 1,-500 ft. S, 9 deg., 6 min. W from most southerly NE cor. of Texas Co.'s Botnay Bay lease, Sec. 4-6s-5e.
Drlg. shale 3,610 ft.
Port Barre Oil Co.'s No. 2 Sybil, 3,080 ft. N easterly along section line, thence 55 ft. at R/A to the east, Sec. 20-6s-5e.
Location.

ROANOKE—JEFFERSON DAVIS PARISH

Humble O. & R. Co.'s No. 1 Nelson Thomas, 880 ft. W of No. 2 Kratzer, 440 ft. N and W of SE cor. of 200-ac. tract.
Location.
Humble O. & R. Co.'s No. 2-B Devilbiss, 1,127 ft. W of No. 1-B, 440 ft. S of N line of S½ of Sec. 11-9s-4w.
Rig up.
Humble O. & R. Co.'s No. 1 Clayton, 2,080 ft. S and 440 ft. W, NE cor. Sec. 10-9s-4w.
Rig up.
Humble O. & R. Co.'s No. 3 Devilbiss, 1,320 ft. W, 466 ft. S of NE cor. Sec. 14-9s-4w
T.D. 9,216 ft.; P.B. to 8,746 ft.; perforated csg. 8,695-8,705 ft.; ran tubing.
Shell Pet. Corp.'s No. 1 Jarnigan, 330 ft E. 660 ft. S. NW cor. Sec. 12-9s-4w.
D.S. stuck; T.D. 10,001 ft.; P.B. to 8,930 ft.; to perforate csg.; milling at 8,750 ft.
Shell Pet. Corp.'s No. 3 Kratzer, 1,320 ft. E and 440 ft. N of SW cor. of lease.
Drlg. sandy shale 5,000 ft.

STARKS—CALCASIEU PARISH

Gulf Prod. Co.'s No. 33 Lutcher Moore, Sec. 19-9s-8w.
Drlg. salt 3,420 ft.

SWEET LAKE—CAMERON PARISH

Pure Oil Co.'s No. 12 Yount Lee Oil Co., 800 ft. S of No. 11, in line with Nos. 9 and 11, Sec. 12-13s-3w.
T.D. 8,196 ft.; pulled csg up to 7,410 ft.

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 1 Noble (W.O.).
Drlg. shale 4,445 ft.
Union Sulphur Co.'s No. 807 fee.
Drlg. sand; show of oil 3,248 ft.
Union Sulphur Co.'s No. 3 Kelly.
Drlg. gumbo 1,210 ft.
Union Sulphur Co.'s No. 809 fee.
Drlg. gumbo 1,762 ft.

WHITE CASTLE—IBERVILLE PARISH

Shell Pet. Corp.'s No. 1 White Castle Shingle Co., 1,320 ft. W, 100 ft. S from NE cor of lease.
T.D. 6,072 ft.; salt.
Shell Pet. Corp.'s No. 1 Adams, 2,240 ft. N. 100 ft. E of SW cor. of lease.
Coring soft sand 5,589 ft.

MISCELLANEOUS WILDCATS

TEXAS

AUSTIN COUNTY

Arkansas Fuel Oil Co.'s No. 1 Herman W. Peschel, 990 ft. out of N cor. of 167.5-ac. tract, R. Stolze Sur.
Prepare to spud.
Paul English et al's No. 1 Felix Guhn, 1,-000 ft. S, 360 ft. E from NW cor. of 71-ac. tract, D. Chomel Sur., 1 mile SE of Kinney.
Derrick.

BRAZORIA COUNTY

Amerada Pet. Corp.'s No. 1 Houston Farm Dev. Co., 1,414 ft. N, 316 ft. W of SE cor. of L. Bachelder Sur.
T.D. of sidetrack hole 6,621 ft.; tested S.W. from 6,575-6,600 ft.; cmtd. back to 6,550 ft.
George Strake's No. 2 Truska, 991 ft. W of No. 1, H.T.&B. Sur., Sec. 7.
S.D. 6,000 ft.
Holt et al's No. 1 Griffith, J. B. Bailey Sur
T.D. 4,200 ft.; waiting orders.
Showers & Moncrief's No. 1 Hughey, 5,500 ft. NW of discovery well, in center of Lot 18, H.T.&B. Sur., Sec. 29, Abst. 393
Location.
Texas Co.'s No. 1 Freeport Sulphur Co., 2,-764 ft. N, 1 deg., 40 ft. W and 1,124 ft. S, 88 deg., 20 ft. W of NW cor. of S. F. Austin Sur., Abst. No. 35, being in the Conception Arcola Sur.
13⅝-in. csg. at 1,531 ft.

CALHOUN COUNTY

Continental Oil Co.'s No. 2 American National Realty Co., 660 ft. from NW line, 660 ft. from NE line of Sec. 6, Blk. C, Pedro Garcia Sur.
Rig up.
Steinberger Pet. Co.'s No. 1 W. A. Shofner, 330 ft. from S and E lines of 100-ac. tract in M. Sanches Sur.
Recovered 3,456 ft. of 40 gravity oil on D.S. test from 6,216-38½ ft.

CHAMBERS COUNTY

South Gulf Oil Co.'s No. 1 J. T. White, Luke Brian Sur., 460 ft. from N line, 460 ft. from W line of 47.9-ac. tract.
Rig up.

FORT BEND COUNTY

W. A. Shafer et al's No. 1 V. B. Bortash, 693 ft. SW of NE line and 1,003 ft. NW of SE line of Sec. 52, H.&T.C. Sur.
S.D. 2,900 ft.
Turnbull & Irwin's No. 1 Herman Hospital, 100 ft. W of E line, 350 ft. N of SL of 446-ac. tract, J. H. Cartwright Sur.
Abd. 6,001 ft.
George White et al's No. 1 M. M. Cravins, 1,000 ft. from N, 300 ft. W of SW cor. of survey, B.B.B.&C. Sur. No. 8.
Rig up.

GALVESTON COUNTY

Gillock Pet. Co.'s No. 2 Maco Stewart, 900 ft. N and 150 ft. W of No. 1, Alex Farmer Sur.
T.D. 1,500 ft.; waiting on surface pipe; S.D.

GRIMES COUNTY

Anderson & Kerr Drlg. Co.'s No. 1 R. Lueders, 500 ft. S of N line, 1,200 ft. E of W line of 320-ac. tract and survey, Blake Brantley Sur., 2½ miles SW of Plantersville.
Rig up.
Hubert Holt et al's No. 1 Simon Fuqua, 1,200 ft. N of S line and 400 ft. W of E line of 177-ac. lease and survey, Moses Evans Sur.
S.D. 3,080 ft.
Dr. Marshall et al's No. 1-B Todd, 300 ft from E line and 175 ft. from N line of 150-ac. tract in extreme NW cor. of county (25 ft. N of No. 1).
S.D. 2,005 ft.
Patton et al's No. 1 Yeager, 1,000 ft. W of E line, 170 ft. S of N line of 53-ac. tract and survey, A. Ruseolle Sur., NW of Iola Sur.
6⅝-in. csg. at 63 ft.; drlg. 660 ft.
Russ Pet. Co.'s No. 1 Gibbs, 990 ft. from NW line, 330 ft. from SW line of survey. 12-in. csg. at 205 ft.
Roan et al's No. 1 S. W. Sealy, 3,474 ft. N of S line and 850 ft. E of W line of survey, B. F. Smith Sur., 2 miles SW of Kellum Springs.
S.D. 2,650 ft.

HARDIN COUNTY

Frazier & Greer's No. 1 Sternberger Lbr. Co., 1,325 ft. S and 400 ft. W of the NE cor. of a 115-ac. tract, J. Pearson Sur.
Derrick.

HARRIS COUNTY

Eureka Heights' No. 1 Varner, 400 ft. from S line of 107.33-ac. tract and 4,173 ft. from E line of H. Rinerman Sur.
Tested S.W. from 7,685-81 ft.; may abd.; T.D. 7,781 ft.
T. S. F. Oil Co.'s No. 1 J. B. Hine, Arthur McCormick Sur., Abst. 46.
T.D. 3,524 ft.; flowing 4 to 6 bbls. of S.W. per hr.
C. C. Foster et al's No. 1 H. K. Johnson 2,000 ft. from S line and C of E and W lines of G.C.&S.F. Sur.
Drilled 25 ft. and S.D.
Johnston & Johnston's No. 1 Fee land, 320 ft. S, 300 ft. E of NW cor. of 20-ac. tract, Sur., Sec. No. 5.
Spudded.
Hill & Hill's No. 1 Wharton, 466 ft. from NW cor. Sec. 5, W.C.R.R. Sur.
7-in. csg. 7,049 ft.; T.D. 7,059 ft.
W. U. Paul's No. 2 House, 100 ft N of No 1, M. Magruder Sur.
7-in. csg. 7,760 ft.; T.D. 7,765 ft.
West Prod. Co.'s No. 1 Woodburn, 1,320 ft. E of W line, 2,145 ft. N of S line of survey, A. Whitlock Sur.
Derrick.

HOUSTON COUNTY

Adams et al's No. 1 Sanders, 330 ft. from S line, 330 ft. from W line of 55-ac. tract of lease, J. Thomas Sur.
T.D. 2,850 ft.; to make electrical coring test.

JACKSON COUNTY

A. M. Harris' No. 1 Whitley, 300 ft. out of SE cor. of F. G. Keller Sur.
Location.
Shell Pet. Corp.'s No. 1 W. W. McCrary 460 ft. out of SE cor. of 50-ac. tract, A Kountze Sur.
Coring sandy lime 4,544 ft.

JASPER COUNTY

Republic Prod. Co. and Houston Oil Co.'s No. 1 Sabine Tram. Co., 330 ft. out of NW cor. Sec. 71, H.&T.C. Sur.
Drlg. shale and limestone 4,411 ft.

JEFFERSON COUNTY

Sun Oil Co.'s No. 1 Rebert & Braussard, 5,-890 ft. NW along SW line and 660 ft. NE at right angles to SW line, B. Blackmar Sur., Abst. No. 2.
Rig up.

LAVCA COUNTY

L. A. Douglas' No. 1 Fehrenkamp, 600 ft. from W line, 720 ft. from N line of Mitchell Sur.
Location.

LIBERTY COUNTY

R. M. Bruner et al's No. 1 N. Bell, 150 ft from N line and 150 ft. from W line of Bell's 187-ac. tract, H.&T.B. Sur. No. 4
Rigging up.
Extension Oil Co.'s No. 1 J. A. Lovett, 330 ft. from E and 600 ft. from S line of lease
P. P. Deevers Sur.
S.D. 4,048 ft.
J. W. Frazier et al's No. 2 Lynott & Bonfum, 466 ft. from N and E lines of 60-ac. tract in extreme SE part of survey, James Robeson Sur.
Clearing location.
Liberty-Independent Oil Co.'s No. 1 J. M. Neal, 3,550 varas from E line and 500 varas from N line of Samuel Strong Sur.
Drlg. shale 4,110 ft.
A. L. Maxwell's No. 1 M. P. Hinciiff, 300 ft. from E line and 1,000 ft. from the N line of survey, H.&T.C. Sur., Sec. 10s.
S.D. 626 ft.
Thomas et al's No. 1-A Eicke, 660 ft. from W line and 2,350 ft. from S line of tract in Green Sur.
T.D. 5,047 ft.; 6⅝-in. csg. at 5,029 ft.
Turnbull & Irwin's No. 1 Cox, 1,000 ft. from the E line and 200 ft. from S line of 308.2-ac. lease, F. J. G. Smiley Sur.
Location.

MADISON COUNTY

Madisonville Pet. Co.'s No. 1 Cannon, 660 ft. N of S line, 440 ft. E of W line of 185-ac. tract, J. V. Phillips Sur.
Location.

MATAGORDA COUNTY

Cockburn Oil Co.'s No. 7 Hawkins, 150 ft. NW of No. 6 Hawkins Sur., D. McCarthy Sur.
Spudded.
Dr. Griffith's No. 1 fee, 3,000 ft. from E line and 3,000 ft. from W line of Wm. H. Bell Sur.
Rigging up and S.D.
Horace M. Smith, Inc.'s No. 1 Wadsworth ranch, 150 ft. out of S cor. of Lot No. 8 Blk. S, R. Fisher Sur.
T.D. 6,161 ft.; cmtd. back to approximately 5,626 ft.; to sidetrack.

MONTGOMERY COUNTY

Travis Baker et al's No. 1 Foster Estate, 1,200 ft. E of W line and 700 ft. S of N line of Blk. No. 50, J. M. De La Garza Sur.
Derrick.
P. & C. Oil Co.'s No. 1 G. B. Rosebury, 466 ft. from N and E lines of 160-ac. tract, A. M. Folks Sur.
Location.
Reynolds Drlg. Co. et al's No. 1 Mrs. Clara B. Stewart, 330 ft. S and E of most easterly inner cor. of 595-ac. tract, John Corner Sur.
S.D. 5,500 ft.
Trans State Oil Co.'s No. 1 Foster, 700 ft. E of W line, 2,000 ft. N of S line, Lot 21.
Drlg. shale 2,720 ft.
Woodard-Smith-Cooper's No. 1 J. V. Scott, F. A. B. Wheeler Sur.
Coring shale 3,361 ft.

ORANGE COUNTY

Blue Line Oil Co.'s No. 1 Godwin, Richard Ballew Sur., 300 ft. from E line and 150 ft. from NE line of Godwin 30-ac. tract.
S.D. 2,770 ft.
Ellis Oil Co.'s No. 1 G. W. Pell, 100 ft. from N and 300 ft. from W line of Pell tract in the J. M. Henerie Sur.
Drlg. shale 1,910 ft.

POLK COUNTY

Howard Dailey et al's No. 1 Z. B. Knox, 1,450 ft. W and 1,920 ft. S of NE cor. of F. Chairs Sur., 16 miles NE of Corrigan.
S.D. 60 ft.
J. F. Anderson's No. 1 E. L. Duke (O.W.D. D.), 400 ft. from E and 350 ft. from S of SW cor. of P. Michelick 50-ac. lease, Abst. 59. P. J. Mineral Sur.
Waiting on a new mud pump; T.D. 5,304 ft.
Humble O. & R. Co.'s No. 1 Texas Long Leaf Lbr. Co., 466 ft. from NE line and 2,250 ft. from the NW line, Sec. 21, A. Vieaca Sur.
Location.
Kirby Pet. Co.'s No. 1 Kirby Lbr. Co., 1,-200 ft. N, 40 deg. W from NE cor. of Geo. Loving Sur., Abstract 402, thence 330 ft. NE at R/A T. F. Pickney Sur.
10-in. csg. at 323 ft.; drlg. shale 1,678 ft.
J. W. Leggett et al's No. 1 Bergman, C of 394-ac. tract, or 1,100 ft. W of H.E.&W.T. R.R., J. T. Pinkney Sur.
Rig up.
Dick Schwab's No. 1 Lynch, 330 ft. out of NW cor. of 200-ac. tract in the George Jameson Sur.
Location.
E. A. Thompson's No. 1 Haynes, 990 ft. out of NW cor. of 320-ac. tract and survey, J. Whitmire Sur., E of Leggett.
Running 9⅝-in. csg.; T.D. 2,806 ft.

REFUGIO COUNTY

Cecil Hagen et al's No. 1 Edith Clarkson, 1,736 ft. from N line, 3,520 ft. from E line of J. Coughlin Sur.
Location.
Magnolia Pet. Co.'s No. 1 Woods, 330 ft. from S and W lines of S. Turner Sur.
Drlg. shale 4,263 ft.

SAN AUGUSTINE COUNTY

Fidelity Exploration Co.'s No. 2 Bryan & Flournoy, 400 ft. from No. 1.
T.D. 1,565 ft.

SAN JACINTO COUNTY

Ralph Sturam et al's No. 1 R. B. Love et al, 475 ft. S of N line and 2,000 ft. W of E line of 177-ac. tract, Drury McGee Sur.
Moving in rig.

TRINITY COUNTY

Boone Bros.' No. 1-C Texas Long Leaf Lbr. Co., C of 80-ac. tract, Martinez Sur.
Lost hole 1,230 ft.; skidded 14 ft. west; Drlg. shale 2,550 ft.

VICTORIA COUNTY

A. I. Ahern's No. 1 Henderson & Pickering, 5,280 ft. from NW line, 330 ft. from NE line of W. M. Rupley Sur.
Drlg. 5,240 ft.

WALKER COUNTY

Boone Bros.' No. 1-D Texas Long Leaf Lbr. Co., 330 ft. E and 375 ft. N of SW cor. of 112.6-ac. tract, Mary Milsap Sur.
Rig up.
S. E. Gray's No. 1 Winsell, 1,200 ft. N and

1,000 ft. E of most southerly S line of survey.
Drlg. shale 1,972 ft.

WALLER COUNTY

Smith et al's No. 1 J. S. Garrett, 4,840 ft. NW and 325 ft. NE from SE cor. of S. M. Williams Sur., 3 miles N of San Felipe.
Drlg. shale 4,310 ft.

WASHINGTON COUNTY

Arkansas Fuel Oil Co.'s No. 1 Witschark, 100 ft. NW of Bruten, 100 ft. S of the center of a 65-ac. tract, J. D. Miller Sur.
Abd. 4,050 ft.

WHARTON COUNTY

Texas Co.'s No. 1 Pierce Estate, 4,850 ft. S, 34 deg. E and 4,300 ft. N, 56 deg. E from W cor. of Tract 2, I.&G.N. Sur. No. 38.
Drlg. shale and lime 5,566 ft.

SOUTH LOUISIANA
ACADIA PARISH

Humble O. & R. Co.'s No. 1 American Rice Mills, 660 ft. S and 1,320 ft. W from NE cor. Sec. 27-10s-1e.
Top sand with gas odor; T.D. 9,139 ft.; fishing for stuck D.S. at 8,991 ft.

Superior Oil Co. et al's No. 1 A. S. Newman, 2,000 ft. N and 1,120 ft. E of SW cor. Sec. 24-7s-1w.
Drlg. sand and shale 7,572 ft.

AVOYELLES PARISH

Bell Drlg. Co.'s No. 2 Thompson, 450 ft. S, 660 ft. E, NW cor. NE¼ Sec. 11-2n-5e.
Rig up and S.D.

Southern State Pet. Co.'s No. 1 Boyette, 330 ft. N and 330 ft. E of SW cor. Sec. 32-3n-5e.
S.D. 100 ft.

BEAUREGARD PARISH

Chew & Kirby's No. 1 Long Bell Lbr. Co., 330 ft. S and W of C of NE¼ Sec. 36-3s-8w.
S.D. 100 ft.

Richardson & Martin's No. 1 Southwest Lbr. Location.

CALCASIEU PARISH

Fred Oil Co.'s No. 2 Faizst, 262 ft. E and 83 ft. S of NW cor. SE¼ Sec. 26-8s-10w.
Spudded and S.D.

Fohs Oil Co.'s No. 1 McIver, 330 ft. S and W of NE cor. Sec. 14-9s-8w.
Location.

Fohs Oil Co.'s No. 2 Castle, located in C of NE¼ of SW¼ Sec. 14-9s-8w.
Coring shale 6,930 ft.

Fohs Oil Co.'s No. 3 Castle, 990 ft. due E of producer in SW¼ Sec. 13-9s-8w.
Coring sandy shale 7,117 ft.

Fohs Oil Co.'s No. 4 Castle, 330 ft. S and 330 ft. W of C Sec. 13-9s-8w.
Coring sandy shale 7,087 ft.

Gulf Prod. Co.'s No. 1 H. Starks et al, 1,650 ft. W and 1,980 ft. S of NE cor. Sec. 26-11s-12w.
Abd. 8,556 ft.

Nicholas McCaleb's No. 1 Grey, 2,200 ft. S, 1,200 ft. E of NW cor. Sec. 22-8s-13w.
Drlg. shale 910 ft.; gas show at 835 ft.

Texas Co.'s No. 1 Nickerson, 3,139 ft. N and 3,238 ft. W of SE cor. Sec. 13-9s-8w.
T.D. 6,721 ft.; pulling screen to core deeper.

Union Sulphur Co.'s No. 3 State, 2,135 ft. S, 2,340 ft. E of NW cor. Sec. 13-9s-8w.
Location.

Union Sulphur Co.'s No. 1 Castle, 326 ft. N and E of NW Sec. 13-9s-8w.
Drlg. shale and lime 7,403 ft.

Union Sulphur Co.'s No. 1 Buhler, 1,485 ft. N and 425 ft. W of SE cor. Sec. 11-9s-8w.
Drlg. hard shale 7,411 ft.

Union Sulphur Co.'s No. 3 Barbe, 396 ft. N and 329 ft. W of SE cor. of NE¼ Sec. 11-9s-8w.
Drlg. wtr. sand 6,126 ft.

Union Sulphur Co.'s No. 1 Reeves-Mayo, 660 ft. NE of discovery.
Drlg. gumbo 2,852 ft.

Union Sulphur Co.'s No. 2 Castle, 660 ft. E of No. 1 Castle.
Drlg. hard shale 6,941 ft.

Wheeler Oil Co.'s No. 1 Gabbert, 1,322 ft. E and 548 ft. N of SW cor of Sec. 28 9s-7w.
Drlg. shale 8,710 ft.

CAMERON PARISH

Magnolia Pet. Co.'s No. 1 J. B. Broussard, 330 ft. E and S, out of NW cor. of the SW¼ of SE¼ of Sec. 13-12s-9w.
Moving in material.

Steinberger Pet. Co.'s No. 1 Drew, 330 ft. out of NW cor. NE¼ of Sec. 26-10s-11w.
Location.

Texas Co.'s No. 2 Nickerson, 2,304 ft. N, 4,322 ft. W of SE cor. NW Sec. 12-9s-8w
Location.

Texas Co.'s No. 1 Jessen, 1,170 ft. E and 550 ft. N of C Sec. 24-14s-10w.
Drlg. shale 9,110 ft.

Wheeler Oil Co.'s No. 1 School Section, 1,-325 ft. N and 2,103 ft. E of SW cor. of Sec. 16-9s-7w.
Digging pits.

EAST FELICIANA PARISH

Thompson Creek Oil Co.'s No. 1 Fannie Noland, 2,600 ft. E and 1,580 ft. N of SW cor. Sec. 70.
Washing to bottom.

JEFFERSON DAVIS PARISH

George W. Strake's No. 1 Calcasieu Natl. Bank, 200 ft. S and E of NW cor. SE NE Sec. 12-9s-6w.
T.D. 8,091 ft.; P.B. to 7,550 ft.; drilled to 8,502 ft.; P.B. to 7,918 ft.; to make D.S. test.

JEFFERSON PARISH

Lincoln Oil Co.'s No. 1 Rigaud, Sec. 33-21s-25e.
Drlg. shale 5,342 ft.

Texas Co.'s No. 1 Bayou St. Dennis, 20,307 ft. S, 4,853 ft. E of NW cor. of Twp., Sec. 19-17s-24e.
Drlg. lime 7,826 ft.

LAFOURCHE PARISH

Southern Sulphur Corp.'s No. 1 D. L. Lagraize, 800 ft. E of NW cor. of Lot 7, thence 250 ft. S of Sec. 26-21s-22e.
Spudded and shut down.

PLAQUEMINES PARISH

Venice Corp.'s No. 1 Burras.
Drlg. lime 2,119 ft.

RAPIDES PARISH

J. B. Evers' No. 1 G. Wettermark, 540 ft. S and 520 ft. E, NW cor. NE SW Sec. 25-6n-2e.
Location.

C. D. Loe's No. 1 Barrett, 330 ft. NW of SE line and 880 ft. NE of SW line of Sec. 40-5n-1w.
Fishing for D.S. 4,375 ft.

Williams-Terrell & Day's No. 1 Armstrong & Murphy, 286 ft. N and 300 ft. W of SE cor. Sec. 24-5n-1w.
Drlg. 800 ft.

ST. BERNARD PARISH

Danciger's No. 1 Battles, 836 ft. N, 2,198 ft. W of SE cor. Sec. 135-14s-14e.
Cmtd. csg.: moved off rig; T.D. 6,001 ft.

ST. MARTIN PARISH

Texas Co.'s No. 1 State-Plumb Bob, 2,107 ft. E and 2,154 ft. N of SW cor. Sec. 9-8s-7w.
Drlg. shale 3,245 ft.

ST. MARYS PARISH

Black et al's No. 1 Chetl-Manchis Indian Reservation, 330 ft. out of NE cor. of tract.
Coring 7,974 ft.

TANGIPOHA PARISH

R. A. Conklin's No. 1 Lake Superior Piling Co., 200 ft. W and N of SE cor. Sec. 19-5s-9e.
Tested fresh wtr. from 2,938-81 ft.

VERMILLION PARISH

Moore Bros.' No. 1 Brussard, 350 ft. S of N line, 250 ft. E of W line, NE cor. Sec. 32-11s-3e.
S.D. 4,056 ft.

La.-Ark. Wildcats

(Continued from Page 164)

EAST CARROLL PARISH

Century Oil & Drlg. Co.'s No. 1 Olive Dell, 660 ft. S, 300 ft. W, NE cor. Sec. 56-31-21e.
S.D. 150 ft.

GRANT PARISH

C. & S. Oil Corp.'s No. 1 Swope, Sec. 17-19-1e.
Rigging up

LA SALLE PARISH

F. A. Trichello's No. 1 Urania, Sec. 3-9-1e.
Junked and abd. 1,491 ft.

MADISON PARISH

Frazier et al's No. 1 Frazier, 330 ft. S and E, NW cor. SE SE Sec. 23-17-10e.
Set 12½-in. 120 ft.; drlg. 200 ft.

NATCHITOCHES PARISH

Clyde Crichton's No. 1 Friedman Est., 406 ft. N, 428 ft. E, SW cor. Sec. 52-7-6.
S.D. 2,934 ft.

Missouri Drlg. Co.'s No. 1 Brown Lbr. Co., 400 ft. N. 330 ft. W, SE cor. Sec. 5-10-10.
S.D. 1,023 ft.

Roy A. Raines et al's No. 1 Raines est., 330 ft. N and E, SW cor. Sec. 8-9-10.
Fishing for D.S. 3,540 ft.

OUACHITA PARISH

J. F. Farrell et al's No. 1 State of La., 3,-345 ft. N, 2,013 ft. W, from common cor. Sec. 49-20-4e.
Set 5½-in. in 2,063 ft.

RAPIDES PARISH

C. D. Loe, trustee's No. 1 Baird Est., SE cor. Sec. 40-5n-1w.
Fishing for D.S. 4,290 ft.

Williams-Carroll & Day's No. 1 Armstrong & Murphy, 286 ft. N, 300 ft. W, SE cor. Sec. 24-5n-1w.
Drlg. 1,450 ft.

RED RIVER PARISH

Sterling O. & R. Co.'s No. 1 Long Bell, Sec. 19-13-9.
Reaming to bottom 2,828 ft.; O.W.D.D.

J. S. Tuffree's No. 1 Wilkinson, 1,320 ft. S and W, NE cor. Sec. 11-12-11.
S.D. for fuel 1,330 ft.

SABINE PARISH

H. J. Brothers et al's No. 1 Edwards, 300 ft. S and W, NE cor. SW NW Sec. 29-9-13.
Tested dry; S.D.; W.O. 2,015 ft.

Crescent Drlg. Co.'s No. 3 Garner, Sec. 3-7-11.
Location.

M. T. Hines' No. 1 J. B. Hill, SW NE Sec. 4-6-11.
Drlg. 1,455 ft.

Helena Oil & Gas Co.'s No. 1-B Graham, 330 ft. S and W NE cor. NE NW Sec. 20-9-13.
Dry and abd. 2,000 ft.

Laurel Pet. Co.'s No. 1 Long Bell Lbr. Co., 330 ft. N and E, SW cor. Sec. 14-8-14.
Set 12½-in. 56 ft.

Lawson-Leavell's No. 1 Whitney Corp., 330 ft. N and E, SW cor. NE SW Sec. 5-9-13.
P.B. to 2,100 ft.; old T.D. 3,409 ft.

Lawson-Leavell & Bryant's No. 4 Bank of P. H., 330 ft. S and W, NE cor. NW NE Sec. 29-9-13.
Set 10-in. 80 ft.

Jack Lent's No. 1 Williams, Sec. 13-7-11.
S.D. 950 ft.

Dave McConnell's No. 1 Whiting Corp., Sec. 3-9-13.
W.O.S.R. 1,956 ft.

Hill Meyers et al's No. 1 Henderson, 320 ft. S and W, NE cor. SE NE Sec. 29-9-13.
Derrick.

Strickland et al's No. 1 Whitney Corp., Sec. 32-10-12.
Recmt. 8-in.; T.D. 1,599 ft.

UNION PARISH

Southern Carbon Co.'s No. 66 fee, 660 ft. S. 1,980 ft. E, NW cor. Sec. 5-20-4e.
Set 6-in. 820 ft.; drlg. 1,320 ft.

WEBSTER PARISH

Virgil Likens' No. 1 E. L. Stewart, 1,020 ft. E, 600 ft. S of NW cor. Sec. 22-18-10.
Recmt. 10-in. 41 ft.; T.D. 600 ft.

ARKANSAS
ARKANSAS COUNTY

Grand Prairie Realty Co.'s No. 1 Fischer, 200 ft. S and E, NW cor. NE NW Sec. 6-6s-4w.
Coring 3,485 ft.

ASHLEY COUNTY

Glenn E. McFaddin et al's No. 1 Boreine Farms, 660 ft. S and W, NE cor. Sec. 1-18-8.
Drlg. 2,400 ft.

COLUMBIA COUNTY

Southern States Gas Co.'s No. 1 Piney Woods Lbr. Co., 330 ft. N and E, SW cor. NE NW Sec. 16-20-22.
Set 10-in. 203 ft.; (corrected).

HEMPSTEAD COUNTY

A. H. Bagnelle's No. 1 Trattner & Rhinehart, Sec. 2-13-26.
S.D. 1,992 ft.

LAFAYETTE COUNTY

W. H. Harvey's No. 2 Allen, Sec. 18-19-24.
Drlg. 2,740 ft.

Kamon & Neely's No. 1 Cockran, NW cor. SE SW Sec. 26-19-25.
Coring 2,865 ft.

Riggs Bros.' No. 1 Dubose, SE cor. SW NW Sec. 35-15-24.
S.D. 1,226 ft.; (corrected).

LONOKE COUNTY

J. G. Strahan's No. 1 Hardin, Sec. 18-2s-7w.
S.D. 1,780 ft.

MILLER COUNTY

Ed Donohue's No. 2 Beck, Sec. 33-15-26.
Set 6-in. 2,919 ft.; T.D. 2,923 ft.

Duluth-Ark. Oil Co.'s No. 4 Beck, SE cor. SE SW Sec. 34-15-26.
W.O.S.R. 2,941 ft.

M. D. K. Fitzwater's No. 1 E. H. Beck, 150 ft. N and E, SW cor. NW SW Sec. 34-15-26.
Drlg. 2,450 ft.

Fitzwater et al's No. 1 Norson, SW cor. SE SW Sec. 30-15-27.
S.D. 3,177 ft.

King Oil Corp.'s No. 1 C. H. Schroder, 200 ft. N, 330 ft. E, SW cor. SW NE Sec. 24-14-28.
S.D. 3,167 ft.

King Oil Corp.'s No. 1 Anderson, 350 ft. E, 200 ft. S, NW cor. SW NE Sec. 16-14-27.
S.D. 1,723 ft.

C. V. Lenz' No. 6 Dale, 373 ft. N, 430 ft. E, SW cor. SE NW Sec. 24-15-26.
Testing 2,855 ft.

A. C. Roan's No. 1 Frost Est., 150 ft. N and W, SE cor. SE SW Sec. 8-15-26.
Set 10-in. 120 ft.

Lee Timberlake's No. 1 Frost Est., 330 ft. N and E, SW cor. SW SE Sec. 27-15-26.
Coring 2,892 ft.

OUACHITA COUNTY

F. A. Book et al's No. 1 Arnold, Sec. 24-15-16.
S.D. 2,032 ft.

S. J. Carnes' No. 1 L. Caldwell, 330 ft. S and E, NW cor. Sec. 12-14-19.
Coring 2,112 ft.

S. J. Carnes' No. 1 Highsmith, NW cor. NE NW C of 2-ac. tract, Sec. 25-13-18.
Rigging up.

T. J. Gaughair's No. 3 M. Bragg, 330 ft. N, 50 ft. E, SW cor. NE SE Sec. 25-13-18.
Set 10-in. 81 ft.

Kraft Oil Corp.'s No. 1 Rath & Cartier, 330 ft. S and E, NW cor. SW SW Sec. 32-13-17.
Drlg. 1,836 ft.

UNION COUNTY

Alice-Sidney Oil Co.'s No. 2-B E. F. Gregory, 330 ft. N and E, SW cor. NW SW Sec. 10-11-14.
Set 10-in. 120 ft.; drlg. 2,400 ft.

Alice-Sidney Oil Co.'s No. 1-B E. F. Gregory, 330 ft. N and W, SE cor. NW SW Sec. 10-17-14.
Comp.; through 2-in. tubing 822 bbls., at 3,377 ft.

J. E. Crosbie, Inc.'s No. 1 W. E. Gregory, 330 ft. S and E, NW cor. NE Sec. 15-17-14.
T.A. 3,503 ft.

J. E. Crosbie, Inc.'s No. 1 Warren, 330 ft. S and W, NE cor. SW SW Sec. 10-17-14.
Set 10-in. 190 ft.; drlg. 1,282 ft.

Gardy Drlg. Co.'s No. 1 Craig, Sec. 35-17-15.
S.D.; W.O. 2,211 ft.

Gulf Ref. Co.'s No. 49 L. Werner, 4,630 ft. N, 60 ft. E, SW cor. Sec. 5-16-16.
Drlg. 3,471 ft.

Reuter Oil Co.'s No. 3 Vinea, NW cor. SW SE Sec. 29-18-14.
D.D. to 2,216 ft.; W.O.S.R.

H. L. Hunt's No. 15 E. F. Gregory, 330 ft. N and W, SE cor. Sec. 10-17-14.
Setting 7-in. 5,834 ft.

H. L. Hunt's No. 13 E. F. Gregory, 330 ft. N and E, SW cor. Sec. 11-17-14.
Derrick.

T. L. James' No. 2-A E. F. Gregory, 330 ft. S, 330 ft. E, NW cor. NW SW Sec. 10-17-14.
Set 10-in. 116 ft.; drlg. 1,100 ft.

Mrs. R. K. Jones et al's No. 1 Davis, 330 ft. N and W, SE cor. NW NW Sec. 28-16-14.
Set 7-in. 2,746 ft.; T.D. 2,765 ft.

Lion Oil Ref. Co.'s No. 6 H. L. Rowland, 330 ft. S and W, NE cor. Sec. 15-17-14.
T.A. 3,427 ft.

Marine Oil Co.'s No. 7-A W. B. Thompson, 330 ft. N and W, SE cor. SW SE Sec. 3-18-13.
Set 10-in. 170 ft.; set 7-in. 3,542 ft.

Joe Modisette et al's No. 1 D. S. Sturdevant, 330 ft. N and W, SE cor. Sec. 6-18-13.
S.D. for repairs 3,169 ft.

C. E. Murdock's No. 1 R. Pumphrey, C SW NW NE Sec. 11-17-14.
Derrick.

Reuter Oil Co., Inc.'s No. 1 J. L. Kinard, 330 ft. S and E, NW cor. SE NW Sec. 32-18-14.
Pumping 2,189 ft.; no gauge.

Earl Patterson's No. 1 C. L. Smith, 1,130 ft. S, 550 ft. E, NW cor. Sec. 29-17-14.
Set 10-in. 202 ft.; drlg. 2,360 ft.

Urbana-Union Oil Co.'s No. 1 U. S. M., 330 ft. S and E, NW cor. E½ SW Sec. 34-17-13.
Set 10-in. 150 ft.

Grady Vaughn's No. 1 T. B. Rowland, 330 ft. S and E, NW cor. Sec. 14-17-14.
Derrick.

MISSISSIPPI
AMITE COUNTY

Mineral Resources, Inc.'s No. 1 Andersen, C NE NW Sec. 14-3n-3e.
S.D. 550 ft.

BOLIVAR COUNTY

White & Jones' No. 1 Ballou, SE SE NW Sec. 17-24n-7w.
S.D. 20 ft.

CLARKE COUNTY

Clarke County Oil Co.'s No. 1 Dora Butler, C SW SW Sec. 15-2n-16e.
Set 10-in. 63 ft.

HARRISON COUNTY

Big Ridge Oil Co.'s No. 1 Hinzin, NE Sec. 13-7s-10w.
S.D.; W.O. 1,100 ft.

HINDS COUNTY

Bob Weaver's No. 1 T. Russell & Oparka, C NW SW NE Sec. 26-6n-1e.
Set 8¼-in. 770 ft.; drlg. 2,350 ft.

ISSEQUENA COUNTY

Pelican Oil & Gasoline Co.'s No. 1 Martin & Bender, 300 ft. S and E, NW cor. Sec. 11-12n-8w.
S.W. and abd. 3,227 ft.

JONES COUNTY

Snow-Black Pet. Co.'s No. 1 Fox, 400 ft. N, 750 ft. W, SE cor. SE SW Sec. 30-7n-13w.
Drlg. 3,150 ft.

LAUDERDALE COUNTY

Bob Dalton's No. 1 Bounds, Sec. 34-7n-15e.
Drlg. 1,450 ft.

MONROE COUNTY

P. J. McAlpine's No. 1 Frank Rye, Sec. 18-15s-17w.
S.D. 2,910 ft.

P. J. McAlpine's No. 1 Crook, 1,090 ft. S 90 ft. W, NE cor. Sec. 15-13s-13w.
S.D.; W.O. liner 2,259 ft.

WALTHALL COUNTY

Mutual O. & G. Co.'s No. 1 Boyd, SW cor. SW SE Sec. 24-2n-9e.
Partly rigged up and S.D.

WARREN COUNTY

H. W. Elliott et al's No. 2 R. L. Parker, 780 ft. E, 1,570 ft. S, NW cor. Sec. 16-14n-1e.
Set 4½-in. 1,600 ft.

WASHINGTON COUNTY

Perkins & Dees' No. 1 Lee, 1,500 ft. E, 500 ft. N, SW cor. Sec. 33-15n-3w.
Set 10-in. 300 ft. and S.D.

WINSTON COUNTY

Jack Vale et al's No. 1 Moody, 713 ft. N 667 ft. E, SW cor. NW SW Sec. 3-13n-14e
S.D. 960 ft.

La.-Ark. Proven Fields

NORTH LOUISIANA
CADDO—BLANCHARD

Louana O. & G. Co.'s No. 1 N. Moore, 1,-320 ft. S, 660 ft. W, NE cor. Sec. 8-18-16.
Derrick.

M. Segall's No. 5 Sharpe, Sec. 11-18-16.
Set 8-in. 20 ft.; drlg. 815 ft.

CADDO—RODESSA

United Gas. Pub. Ser. Co.'s No. 1 Fosque Unit, 1,320 ft. N and E, SW cor. Sec. 28-23-16.
Set 7-in. 5,540 ft.

United Gas Pub. Ser. Co.'s No. 1 Johnson Unit, 1,245 ft. S, 1,365 ft. W, NE cor. Sec. 26-23-16.
Drlg. 3,820 ft.

SABINE PARISH—ZWOLLE

Alexander & Crane's No. 1 Fogman, SE cor N¼ SW NE Sec. 18-7-11.
Set 6-in. 2,743 ft.

Ivan A. Allen's No. 1 La. Long Leaf, 330 ft. N and W, SE cor. NW SE Sec. 12-7-11.
S.D. 2,120 ft.

H. C. Maulding's No. 1 Davis, 350 ft. N and W, SE cor. NE NE Sec. 3-7-11.
Rigging up.

K. C. Peterson et al's No. 1 Bowman-Hicks 330 ft. S and E, NW cor. SW NW Sec 3-7-9.
Derrick down.

Tex.-La.-Ark. Oil Co.'s No. 1 Pickering Lbr Co., Sec. 3-3-12.
S.D. 2,742 ft.

EAST TEXAS (BORDER COUNTIES)
HARRISON COUNTY

R. C. Payne et al's No. 1 Lowery, E. D Spain Sur.
P.B. to 3,524 ft.

MARION COUNTY

Ed S. Holman's No. 1 Henderson, R. Bennington Sur.
P.B. to 2,443 ft.

PANOLA COUNTY

R. A. Graddy's No. 1 M. J. McCormick, J. McAdams Sur.
Moving in rig.

George Hudson et al's No. 1 J. F. Nail, C. McGeary Sur.
Set 8-in. 40 ft.; fishing for core bbl. at 2,345 ft.

Geo. Le Grand's No. 1 P. J. Wardleigh, A. Thompson Sur.
Set 10-in. 62 ft.

R. W. Price's No. 1 Crawford, J. A. Williams Sur.
Set 10-in. 64 ft.

Fred Stovall Drlg. Co.'s No. 1 H. D. Ivey P. Martin H.R.S.
S.D. for csg. 1,980 ft.

SHELBY COUNTY

Cliff Stovall's No. 1 Pickering Lbr. Co., C H. Patterson Sur.
S.D.; rig repair, 1,485 ft.

O. P. Bush, trustee's No. 1 Pickering Lbr Co., P. W. Harvey Sur.
S.D. 730 ft.

ALABAMA
COVINGTON COUNTY

Geometer Prod. Corp.'s No. 1 Culbreath, SW cor. SW NE Sec. 8-2n-14e.
Drlg. 3,850 ft.

HOUSTON COUNTY

Rice O. & G. Co.'s No. 1 Oakley est., SE cor. NW SW Sec. 9-3n-29e.
S.D.; W.O. 2,506 ft.

LAMAR COUNTY

DeSoto O. & G. Corp.'s No. 1 Gardner, Sec. 23-15s-16w.
S.D. 4,182 ft.

WALTON COUNTY—FLORIDA

Geometer Oil Corp.'s No. 2 Walton Land & Timber Co., Sec. 10-1s-19w.
Drlg. core tests on block; R.U. and S.D.

MARKET RECORD OF OIL SECURITIES

Active Oil Stocks Listed on New York Stock Exchange

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1935 High	1935 Low	Week ended March 30 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends paid in 1934	1934 High	1934 Low	1933 High	1933 Low
57	48½	1,900	52¾	50¼	51¾	Amerada Corp.	774,875	N.P.	50cQ	1-31-35	$2.00	55⅝	39	47⅝	18½
25⅜	21⅜	5,000	22¼	21¾	22¼	Atlantic Refining	2,673,834	$25	25cQ	3-15-35	1.00	35¼	21½	32½	12⅜
7	5⅞	3,900	6½	6¼	6⅜	Barnsdall Corp. A	2,248,795	$5	....	5-11-31	....	10	5⅞	11	3
7	3⅜	26,100	6	5½	5¾	Columbia Gas & Elec.	11,610,036	N.P.	....	5-15-34	‡ .25	19¼	6⅝	28⅛	9
8¾	6½	11,200	7⅜	6⅞	7	Consolidated Oil Corp.	14,218,835	N.P.	14c	10-31-34	.42	14¼	7¼	15⅜	5
19⅛	15⅛	8,800	16⅞	15½	16⅞	Continental Oil of Delaware	4,738,593	$5	12½c	4-30-35	.50	22⅜	15¾	19⅝	4⅞
18⅞	11¾	1,700	13¾	13	13	General Asphalt	387,149	$10	....	6-15-32	....	23½	12	27	4⅝
3⅜	1½	700	2⅜	2⅛	2⅛	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	5⅝	2½	7⅜	1⅞
1⅞	¾	600	⅞	¾	⅞	Louisiana Oil Refining	1,302,158	N.P.	....	.....	....	3⅜	¾	4	⅝
12⅞	9½	1,800	10⅜	10⅛	10⅛	Mid-Continent Petroleum	1,857,912	$10	25c	11-15-34	.50	14¾	9⅛	16	3¾
14⅝	9	800	10½	9¾	10½	National Supply of Delaware	382,591	$25	....	5-15-31	....	21⅛	10	28⅝	4
10⅞	9¼	6,600	9⅞	9⅝	9⅞	Ohio Oil Co.	6,563,107	N.P.	15c	12-15-34	.45	15⅞	8½	17⅝	4¾
8¾	7	100	8⅛	8⅛	8⅛	Pacific Western Oil	1,000,000	N.P.	40c	11-30-34	.40	9⅜	5½	9½	3
1⅜	⅝	No sales ..	..	..	..	Panhandle P. & R.	198,770	N.P.	....	.....	....	2½	⅝	4¼	⅝
16	13¾	10,500	15⅞	15⅜	15⅜	Phillips Petroleum	4,154,687	N.P.	25c	3-1-35	1.00	20¾	13⅜	18¾	4¾
8¾	6½	1,700	7½	7¼	7¼	Plymouth Oil Co.	1,014,082	$5	4% Stk.	12-22-34	75c & 4% Stk.	16¾	7¼	17⅝	6¾
7¾	5⅞	4,400	6⅛	5¾	6	Pure Oil	3,038,370	N.P.	....	9-1-30	....	14⅞	6⅛	15⅝	2½
32⅜	29½	1,100	32	30⅞	31⅜	Royal Dutch N. Y. shares	432,224	$14	$1.35	7-31-34	1.35	39⅛	28⅝	39¾	17⅝
26⅞	20¾	1,300	23¾	23	23½	Seaboard Oil of Delaware	1,204,460	N.P.	15cQ†	3-15-35	1.00	38⅜	20¾	43⅜	15
7⅞	6½	3,100	5⅞	5⅝	5¾	Shell Union Oil	13,070,625	N.P.	....	6-30-30	....	11½	6	11⅝	4
78¾	64½	300	67½	66½	66½	Shell Union Oil pfd.	400,000	$100	....	7-1-31	....	89	57	61	28½
18¾	13½	4,900	16½	15½	16¼	Simms Petroleum	461,698	$10	50c	2-1-35	.55	17⅛	7¼	12⅜	4⅞
8	6½	700	8	7¾	8	Skelly Oil	1,008,514	$25	....	12-15-30	....	11½	6	9⅞	3
14⅞	11	13,400	12⅞	12¼	12⅜	Socony-Vacuum	31,019,694	$25	15cQ	3-15-35	.60	19⅞	12½	17	6
32⅜	27⅜	5,300	30	29	29½	Standard Oil of California	13,102,900	N.P.	25c	3-15-35	1.00	42⅞	26½	45	19½
25¼	23	12,600	23⅝	23¼	23½	Standard Oil (Indiana)	15,941,894	$25	25cQ	3-15-35	1.00	32¾	23¼	34	17
32	28¼	100	28¼	28¼	28¼	Standard Oil of Kansas	200,000	$10	50cQ	10-31-34	2.00	41	26	39⅞	12¾
43½	35¾	11,900	38¼	37	37	Standard Oil of New Jersey	25,740,065	$25	50cSA†	‖3-15-35	1.25	50⅛	39¼	47½	22¾
68½	60	300	62	62	62	Sun Oil	1,733,013	N.P.	25cQ	3-15-35	$1 & 9% Stk.	74¼	51½	59	35
21⅝	16½	2,500	18	17⅛	17¾	Texas Corp.	9,486,417	$25	25cQ	4-1-35	1.00	29⅜	19⅝	30⅛	10¾
4¼	3¼	2,700	4	3½	4	Texas Pacific Coal & Oil	880,703	$10	....	12-31-29	....	6½	2½	6½	1⅜
10	7⅝	4,900	8	7¾	7¾	Tide Water Associated	5,618,672	N.P.	....	2-16-31	....	14⅜	8	11¾	3¼
88½	84	800	88½	87⅝	88⅜	Tide Water Associated pfd.	666,524	$100	$2§	4-1-35	§8.50	87	64½	65¼	23½
16⅞	14¾	1,500	16¼	15⅞	15⅞	Union Oil of California	4,386,070	$25	25cQ	2-9-35	1.00	20½	11½	23⅜	8½
26⅛	20⅞	900	24	23	23½	Union Tank Car Co.	1,200,000	N.P.	30cQ	3-1-35	1.20	25¾	15⅝	22¾	10½
2⅝	1	700	1½	1½	1½	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	5¾	2	5½	2

*Ex-dividend. †Plus extras. ‡Payable in preferred stock. §On account of accumulated and current dividends. ‖Distribution 4/75 Mission Corp.

Active Oil Stocks Listed on New York Curb

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1935 High	1935 Low	Week ended March 30 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends paid in 1934	1934 High	1934 Low	1933 High	1933 Low
33	30½	100	33	33	33	Buckeye Pipe Line Co.	200,000	$50	75cQ	3-15-35	$3.00	38	26	39¾	25
2⅜	1⅝	900	1⅞	1⅝	1⅝	Carib Syndicate	799,020	25c	....	.....	....	5½	1½	7¾	¼
157	115	250	138½	115	115	Chesebrough Mfg. Co.	120,000	$25	$1Q†	3-29-35	11.50	150	116	129	71
1½	¾	9,500	1	⅞	1	Cities Service	37,804,394	N.P.	....	6-1-32	....	4¼	1¼	6¼	1½
1	¾	300	¾	⅝	¾	Colon Oil	2,200,000	N.P.	....	.....	....	3¼	½	4	¼
⅞	⅜	100	½	½	½	Cosden Oil	399,687	$1	....	.....	....	3⅞	½	3⅞	1⅜
13⅜	10	4,000	11	10¼	10⅞	Creole Petroleum	6,974,356	$5	....	.....	....	14⅜	9⅝	12	4¾
4⅞	4¼	100	4¼	4¼	4¼	Darby Petroleum	509,696	$5	25c	1-25-35	.50	7½	4⅛	8	2⅛
1⅛	1	100	⅞	⅞	⅞	Derby Oil & Refining	263,162	N.P.	....	.....	....	2¼	1	2¾	⅞
38	34	No sales ..	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	5-1-35	4.00	37	30	41¾	20
60⅞	50¼	1,300	52½	51	52	Gulf Oil Corp.	4,538,101	$25	....	10-1-31	....	76¾	49¾	62	24
50¾	44	1,900	47¼	46½	46¾	Humble Oil & Refining (new)	8,923,935	N.P.	25cQ	4-1-35	§1.25	496	33¼	105½	40
17⅛	15⅜	5,000	16¼	15¾	16¼	Imperial Oil of Canada	26,857,152	N.P.	25cSA†‡	12-1-34	.92½	17⅞	12⅝	15⅞	6½
4½	3⅝	200	4¼	4	4⅛	Indiana Pipe Line	300,000	$10	15cSA	5-15-35	.35	6⅞	3⅝	8	3⅛
31⅜	28	6,500	31	29⅝	30⅞	International Petroleum	14,247,088	N.P.	56cSA†‡	12-1-34	2.28	33⅜	19⅝	23½	8⅞
6	4⅜	4,200	5⅞	5½	5½	Louisiana Land & Exp.	3,000,000	N.P.	....	.....	....	5	2⅛	2¼	⅛
4⅜	3½	100	3½	3½	3½	Lion Oil Refining	270,000	N.P.	....	10-27-30	....	6	3⅜	9½	1¼
6¼	4½	1,400	5⅛	4⅞	5	Lone Star Gas	5,382,723	N.P.	15c	2-15-35	‖ .16	8⅜	4¼	11⅞	4¾
4⅝	4⅛	1,300	4⅜	4⅛	4⅜	Mountain Producers	1,682,182	$10	15cQ	4-1-35	.60	5½	4	6½	2½
14	11⅜	1,700	13⅞	13¼	13½	National Fuel Gas	3,810,183	N.P.	25cQ	4-15-35	1.00	18⅛	13⅛	20	10
8	6⅝	300	7½	7¼	7¼	National Transit	509,000	$12.50	35cSA	12-15-34	.75	9½	7	10	5½
2⅝	2	No sales ..	..	..	..	New Bradford Oil	1,445,202	$5	10cSA	3-15-35	.20	2½	1¾	2⅛	½
2⅛	1⅜	100	1⅜	1⅜	1⅜	New Mexico and Arizona	1,000,000	$1	....	.....	....	2¾	1	1⅞	½
3⅝	3¼	No sales ..	..	..	..	New York Transit	100,000	$5	15cSO	10-15-34	.30	4¾	3	4⅝	3
5⅝	5¼	No sales ..	..	..	..	Northern Pipe Line	120,000	$10	25cSA	1-2-35	.50	7	4⅝	6⅛	4¼
2⅛	1¼	10,100	1½	1¼	1⅜	Pantepec Oil	1,608,700	N.P.	....	.....	....	2⅝	⅞	3⅜	⅛
1¼	1	100	1⅛	1⅛	1⅛	Ryan Consolidated	296,931	N.P.	....	.....	....	3⅜	⅞	4¼	⅝
6¼	5⅝	1,100	5¾	5½	5¾	Salt Creek Producers	1,496,859	$10	20cQ	2-1-35	.80	7⅞	5½	9¼	3½
23¾	21⅝	400	22½	21⅝	22½	South Penn Oil	1,200,000	$25	30cQ	3-30-35	1.20	26½	17½	22⅛	11
4⅛	3⅞	100	4⅛	4⅛	4⅛	Southern Pipe Line	100,000	$10	15cSA	3-1-35	.25	5½	3½	6	2⅛
52¼	45¼	No sales ..	..	..	..	Southwest Penna. Pipe Lines	35,000	$50	$1Q	4-1-35	5.00	47	41	43	24½
21⅝	18	2,600	19⅛	18½	18¾	Standard Oil of Kentucky	2,606,983	$10	25cQ†	3-15-35	1.50	18⅜	14⅝	19¼	8⅝
9	7¾	200	8	7¾	8	Standard Oil of Nebraska	190,822	$25	....	6-20-34	.50	16⅞	8¼	20½	11
16¼	11½	1,400	13⅝	11½	11½	Standard Oil of Ohio	753,740	$25	....	1-3-33	....	28½	12¼	41	15½
1¼	1	300	1⅛	1	1	Sunray Oil	1,610,810	$1	....	4-15-31	....	2	⅛	1½	¼
6⅞	5	1,800	6	5¼	6	Texon Oil & Land	936,028	N.P.	15cQ†	12-29-34	.90	11	4⅝	13¾	6¼

*Ex-dividend. †Plus extras. ‡Payable in Canadian funds. §Includes 50 cents on old $25 par value stock. ‖Payable in preferred stock.

Note—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

FIELD PROBLEMS FROM READERS

Edited by Thomas F. Smiley

This department is conducted in order that men connected with the drilling, producing and transporting branches of the petroleum industry may obtain aid in solving problems that confront them in their work. Readers are invited to send questions freely. These questions will be placed in the hands of persons capable of answering them authoritatively, and the answers, based on the best available information, will be published.

Each question should give as much detail as possible, especially if it involves depths of sands, types of sands and operations on adjoining or nearby properties. The source of questions will be considered confidential, and only the initials of the sender will be published. Questions involving patented processes, intricate formulas or estimates of cost cannnot be answered. If an immediate answer is important, one will be given by mail when the writer requests it.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or improved old ones.

Two Questions Are Raised After Acidizing Viola Lime Well

In acidizing a Viola lime well approximately 4,200 feet deep, finished with 3,700 feet of 7-inch casing set and cemented above the 500-foot Viola lime section, and 2½-inch tubing run to about the bottom of the hole, or 4,200 feet, some problems have arisen. On open-flow test through casing this well made about 250 bbls. of oil per hour. The formation pressure is about 1,850 pounds per square inch. Shut-in casinghead pressure 500 pounds per square inch. In treating the well in hopes of increasing the production rate 1,000 gallons of inhibited hydrochloric acid was pumped into the tubing and a pump pressure built up to about 900 pounds with the casing shut in. The valve at the casinghead was opened when this pressure stalled the pump and with this relief the acid went into the tubing and pump pressure dropped from the 900-pound maximum to about 20 points vacuum. This indicated that the tubing had been freed of fluid. Oil was then pumped into the tubing, but as the treating pump would not build up more than 900 pounds pressure a line pump capable of developing higher pressure was hooked on to the tubing and oil pumped into the tubing for some time. The question raised is whether the acid was expelled from the tubing when the vacuum registered on the pump pressure gauge and whether the pumping of extra oil into the tubing with the high pressure pump assisted in acidizing the lime. While pumping in the oil the casinghead valve was closed.—D. P. S.

This problem is interesting and engineers consulted say it suggests several possible explanations, but because some of the pertinent facts are not known any solution offered must be taken with reservations, for any change in assumed conditions would materially alter results.

First consider the capacity of the tubing and the annular space between the 7-inch casing and the outside of the tubing. If the 4,200 feet of 2½-inch tubing is filled with acid it would hold just slightly over 1,000 gallons—1,022 gallons to be exact—very near the quantity you say was used in the treatment.

It follows that any movement in the tubing would cause acid to be discharged into the bottom of the hole. It is estimated that this 500 feet of 8¾-inch hole would hold 1,439 gallons of fluid outside of the tubing. This is equivalent to 287.8 gallons per 100 feet of hole. The 1,000 gallons of acid would fill the hole to a height of about 350 feet above bottom.

Displacing the acid that filled the tubing, or about 1,000 gallons, would cause the annular space between the 7-inch casing and tubing to be filled to a height of 715 feet. This would mean that oil that was in the hole was displaced and if the bottom-hole pressure is known to be about 1,850 pounds and the shut-in pressure at the casinghead 500 pounds, it is calculated that the fluid column in the well when shut in was about 3.650 feet above the bottom of the hole. This calculation is based upon the height of a column of oil that could be sustained by 1,350 pounds pressure, the difference between 1,850 pounds bottom-hole pressure and the 500-pound gauge pressure at casinghead when the well was shut in.

With the fluid standing in the casing and tubing at 3,650 feet above the bottom of the hole, it would follow that there was about 550 feet of the upper part of the hole filled with gas under well shut-in conditions. This 550 feet of annular space in the 7-inch casing will accommodate about 767 gallons of fluid.

So it seems safe to assume that when the pump pressure dropped and 20 inches of vacuum was pulled on the gauge at the pump the tubing was emptied of all fluid. There were about 888 gallons of oil inside of the tubing with the fluid level at 3,650 feet above well bottom and this was displaced along with the 1,000 gallons of acid.

This 1,888 gallons of oil and acid would cause about 1,000 gallons of fluid to flow out of the casing when the valve was opened and it is not known how much more oil, and perhaps some of the acid, might have flowed from the well and into the tanks while this casinghead valve was opened to permit the pump to force fluid into the tubing.

Based upon the several general assumptions it is believed that the 1,000 gallons of acid did leave the tubing when the pressure gauge registered about 20 inches of vacuum. If oil then was pumped into the tubing and the acid had mixed with the oil in the hole it seems probable that using the high pressure pump after dumping the charge of acid into the well did no good. It probably stirred the acid and oil together for the acid, which has higher specific gravity than the oil, could not settle in the hole until pressures were equalized. Pressures would tend to equalize when the well was shut in, but if the pump was kept going and oil was pumped into and out of the casing after the acid had been dumped by the complete release of pressure within the tubing, it seems safe to assume that the pump did not do any good and perhaps did harm.

With a well that already has production and considerable formation pressure it would seem that the best method of treating would be to force the acid into the tubing, then release pressure on the tubing and permit all fluid in it to drain out, then quickly shut in the well, both casing and tubing valves and allow the acid to settle to the bottom of the hole, where it will go in time because the specific gravity of hydrochloric acid is about 1.04 while 36 gravity oil has a specific gravity of .8448.

Factors That Must Be Considered in Matter of Well Spacing

I have been considering the matter of well spacing and have read several articles on the subject. All of them, however, seem to argue that the particular program they favor is the best one for all fields of the same general character in the matter of volume of production. I am not posted on the subject, but it seems to me there might be other things that ought to be considered. For instance, it is easier to drain some sands than others. Shouldn't that be considered? Maybe there are other things. I would appreciate whatever information you can give me on this subject.—R. E. G.

It is true that many factors, some of them complex, figure in the problem of well spacing. Generally speaking, the more wells drilled on a property the greater will be the oil recovery and the more quickly it will be obtained. But it must be remembered that the greater the number of wells the higher will be development and lifting costs. There is a definite relationship between the cost of drilling wells, the volume and value of their ultimate oil recovery and the term of their profitable productive life, and this relationship should be the guide in deciding how many wells to put down. The subject is discussed by L. C. Uren in his "Petroleum Production Engineering":

"Among the physical variables influencing the economic spacing of wells, it is clear that the sand permeability and reservoir pressure under which the oil is stored are important considerations. The more permeable the reservoir rock and the higher the field pressure, the more widely spaced may the wells be to achieve a desired percentage recovery. The thickness and porosity of the reservoir rock are important in determining its storage capacity. The thicker and more porous sands yield more oil and therefore support a greater number of wells. Another important physical factor is found in the diameter of the well through the reservoir rock. The larger the bore of the well, the more effective will it be in securing high-percentage recovery of the drainable oil. Hence, large-diameter wells may be more widely spaced for the same drainage effect. If, on the other hand, the primary interest is the "pay-out status," large-diameter wells may be more closely spaced. Consideration must be given to the position on structure in determining a suitable spacing for wells. Those near the crest of a well-developed anticlinal or domal structure have the advantage of greater gas energy in expulsion of oil from the reservoir rock and therefore secure a greater percentage of the drainable oil than is possible from downdip locations where gas is less plentiful. Wells may be more closely spaced on the structural crest and yet pay out. Movement of gas is preferably up the dip of the formation; hence in so far as expulsion of oil by gas is concerned, oil migration is also accomplished with greatest facility in this direction. It would therefore appear that for uniform recovery wells should be more closely spaced in the direction of the strike of the formation than in the direction of the dip.

"Economic factors are equally important in determining the number of wells that may be profitably drilled on a given tract of land. The cost of drilling and equipping wells increases rapidly with depth, and the cost per foot varies with the character of the formation penetrated. It follows that where the wells must be deep or the formations are unusually costly to drill, wells must be more widely spaced if they are to be profitable. The unit-production cost, as influenced by the depth of the wells and rate of unit production costs will also be important in determining economic well spacing. Lower unit production costs will permit of closer well spacing. Furthermore, the selling price of the product is a factor of importance. If the oil is of high quality or if, for competitive reasons, it commands a good price, the wells may be more closely spaced than in fields where the oil prices are low. The interest-earning capacity of invested capital has its influence on well spacing in diminishing the present value of future profits, thus increasing the incentive for prompt realization on invested capital. This would be promoted by close spacing of wells."

Why Was It Called That?

ENGINEER

There is nothing new about engineering as a profession. And it must not be supposed the old-time engineer—meaning not one of a century ago, but of 50 centuries—was lacking in accuracy of calculation, even though the slide rule had not yet been invented. For instance, the Great Pyramid of Gizeh, the tomb of Cheops, was planned and built by Egyptian engineers and workmen about 5,000 years ago with such mathematical exactness that the errors in its sides are less than a little finger's breadth in length and angle in a total length of 755 feet. About 6,000,000 tons of stone were used in erecting this monument. Herodotus tells that 100,000 men labored for 20 years in building it. The word "engineer" is supposed to have been built from engine + -eer, as in "racketeer," "musketeer," "profiteer," etc.

Osage Lease Auction Brings $639,400 for 62 Out of the 80 Tracts Offered

The Osage lease auction March 27 would have been a palpable failure had it not been for the Enterprise Transit Co. coming to the rescue with a combined bid of $538,600 for four tracts, all of which were in the old Burbank Field vicinity. Minus the Enterprise Transit Co.'s bonus of $538,600, the 58 tracts remaining were auctioned for $98,800, the Enterprise Transit Co. paying 85 per cent of the total bonus. The highest price paid for any one tract was $301,000 for the NE of Section 34-26n-6e.

Oklahoma oil men paid a total of $639,400 for 62 out of 80 tracts offered.

Tr. No.	Description	Acreage	Buyer and address—	Price
			Skiatook Area	
1	SW 7-22-12	160	Passed	
			Ramona Area	
2	SW 33-24-34	160	J. P. Devine, Pawhuska	$200
			Flat Rock Pool	
3	NE 32-21-11	160	Passed	
			Wildhorse Area	
4	NW 9-22-1	160	Ray Branstetter, Skiatook	900
5	SW 9-22-11	160	Bay Oil Corp., Tulsa	2,200
			West Avant	
6	SW 31-23-11	160	J. P. Devine, Pawhuska	200
			Okesa Area	
7	SW 21-26-11	160	G. K. Sutherland, Hominy	200
			Keystone District	
8	NE 5-20-10	160	Peters Petroleum Corp., Tulsa	200
9	SE 5-20-10	160	Norbla Oil Co., Tulsa	700
10	SW 5-20-10	160	Midco Oil Corp., Tulsa	600
11	Fr. NW 8-20-10	49.79	Danciger Oil & Ref. Co., Inc., Tulsa	200
			South Barnsdall	
12	NE 7-23-10	160	M. O. Stephenson, Pawhuska	200
13	NW 7-23-10	160	M. O. Stephenson, Pawhuska	200
14	SE 7-23-10	160	Passed	
			Wynona Area	
15	SE 8-24-10	160	Passed	
			Nelagoney Area	
16	NE 5-25-10	160	Turman Oil Co., Tulsa	450
17	NW 5-25-10	160	Turman Oil Co., Tulsa	600
18	SE 5-25-10	160	Bay Oil Corp., Tulsa	1,500
19	SW 5-25-10	160	Turman Oil Co., Tulsa	1,500
			Osage City Sector	
20	SW 18-21- 9	160	Johnson Oil & Ref. Co., Cleveland	1,400
21	NE 29-21- 9	160	Passed	
22	SW 29-21- 9	160	Midco Oil Corp., Tulsa	300
			Birch Creek Pool	
23	SE 3-23- 9	160	Virgil E. Riddle, Tulsa	200
			Manion Pool	
24	NE 19-23- 9	160	Bay Oil Corp., Tulsa	2,600
25	NW 19-23- 9	160	Bay Oil Corp., Tulsa	5,200
42	SW 25-23- 8	160	Midco Oil Corp., Tulsa	400
			Buell Pool	
26	NE 27-23- 9	160	Norbla Oil Co., Tulsa	650
27	SE 27-23- 9	160	Norbla Oil Co., Tulsa	1,000
			Sunset Pool	
28	NE 34-23- 9	160	Norbla Oil Co., Tulsa	700
			Pershing Pool	
29	SW 3-24- 9	160	Passed	
30	NE 4-24- 9	160	Passed	
31	SE 4-24- 9	160	Passed	
33	NW 33-25- 9	160	Passed	
34	SW 33-25- 9	160	Passed	
			Pawhuska Pool	
32	SE 9-25- 9	160	Passed	
35	NW 31-26- 9	160	Passed	
36	SW 31-26- 9	160	Passed	
37	SW 33-26- 9	160	Passed	
			Osage City Area	
38	Fr. NE 22-21- 8	64.97	Fred Tillman, Louis Fink, Pawhuska	100
39	NE 2-22- 8	160	Bay Oil Corp., Tulsa	1,000
40	SE 2-22- 8	160	Bay Oil Corp., Tulsa	500
			Tidal-Osage Pool, Hominy Sector	
43	NW 36-23- 8	160	Virgil E. Riddle, Tulsa	500
44	SW 36-23- 8	160	Virgil E. Riddle, Tulsa	700
			Dalton Pool	
45	NW 6-24- 8	160	H. F. Worley, Tulsa	650
46	SE 6-24- 8	160	D. F. Millard, Pawhuska	200
			Kaslahke Pool	
47	NE 19-24- 8	160	Indian Ter. Illum. Oil Co., Bart'ville	4,100
48	NE 20-24- 8	160	Norbla Oil Co., Tulsa	1,000
49	NW 20-24- 8	160	Norbla Oil Co., Tulsa	2,800
			Falls Dome Pool	
50	NE 28-24- 8	160	G. K. Sutherland, Hominy	900
			Atlantic Pool	
51	SW 34-25- 8		Passed	
			Myers Area	
52	NW 35-26- 8	160	L. J. Vance, Pawhuska	200
53	NE 36-26- 8	160	L. J. Vance, Pawhuska	200
54	SE 26-26- 8	160	Passed	
			West Pawhuska	
55	SE 35-26- 8	160	Passed	
56	SW 35-26- 8	160	Passed	
57	SE 36-26- 8	160	L. J. Vance, Pawhuska	200
58	SW 36-26- 8	160	George Mellott, Jr., Pawhuska	200
			North Boston	
41	SW 19-23- 8	160	Phillips Petroleum Co., Bartlesville	13,000
59	SW 22-25- 7e	160	Bay Oil Corp., Tulsa	800
			Gilliland Pool	
60	SE 1-23- 7	160	Texas Co., Tulsa	3,600
61	SW 1-23- 7	160	Texas Co., Tulsa	1,600
			East Burbank*	
62	NW 6-25- 7	160	Norbla Oil Co., Tulsa	400
63	SW 6-25- 7	160	Norbla Oil Co., Tulsa	600
			South Grayhorse	
64	NE 9-23- 6	160	Midco Oil Corp., Tulsa	700
65	SE 9-23- 6	160	Norbla Oil Co., Tulsa	800
			South Burbank Pool	
66	NE 1-25- 6	160	Danciger Oil & Ref. Co., Tulsa	1,700
67	SE 1-25- 6	160	Danciger Oil & Ref. Co., Tulsa	1,700
68	NE 4-25- 6	160	Phillips Petroleum Co., Bartlesville	25,200
69	NE 18-25- 6	160	Danciger Oil & Ref. Co., Tulsa	750
70	SE 18-25- 6	160	Danciger Oil & Ref. Co., Tulsa	200
			Old Burbank	
71	NE 13-26- 6	160	H. F. Attieberger, Tulsa	1,400
72	SE 13-26- 6	160	H. F. Attieberger, Tulsa	1,400
73	SW 23-26- 6	160	Midco Oil Corp., Tulsa	600
74	NE 23-26- 6	160	Bay Oil Corp., Tulsa	5,200
75	NW 27-26- 6	160	Midco Oil Corp., Tulsa	2,600
76	NE 34-26- 6	160	Enterprise Transit Co., Tulsa	301,000
77	NE 35-26- 6	160	Enterprise Transit Co., Tulsa	9,400
78	NW 35-26- 6	160	Enterprise Transit Co., Tulsa	223,000
79	SE 35-26- 6	160	Enterprise Transit Co., Tulsa	5,200
			Southwest of Grainola	
80	NE 22-28- 5	160	H. F. Worley, Tulsa	1,000
	Total acreage	12,594.76	Total	$637,400

*Name arbitrarily made by the writer pending action by the nomenclature committee.

Canadian Fields

(Continued from Page 174)

reserve will be built up for the drilling of Devenish's No. 5 in LSD 4, same section, standing since last fall at 630 feet. About 510 bbls. of heavy crude were taken from No. 3 last year for drilling fuel.

Aldersyde Structure

On the Aldersyde structure, east of Turner Valley, Ranchmen's Gas & Oil Co.'s No. 1, LSD 16, Section 13-20-28w4, has cleaned out to bottom at 6,263 feet and is starting to deepen into the sand. There is a fair gas flow, which has not been measured, and a considerable accumulation of light crude oil was bailed. Control equipment has been installed to handle gas production.

Lloydminster Gas Field

In western Saskatchewan, Lloydminster Gas Co.'s No. 2, about 1 mile east of No. 1 gasser, has spudded. J. L. Wilson and Charles Mills are in charge.

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